RAC II
EPA Region 8

Final Work Plan
Volume 1

San German Groundwater Contamination Site
Remedial Investigation/Feasibility Study
San German, Puerto Rico

EPA Contract No. EP-W-05-049
WA 223-RICO-02YP

May 19, 2010

REMEDIAL ACTION CONTRACT
FOR REMEDIAL RESPONSE, ENFORCEMENT OVERSIGHT,
CRITICAL REMOVAL ACTIVITIES AT SITES OF RELEASE OR
THREATENED RELEASE OF HAZARDOUS SUBSTANCES
IN EPA REGION VIII

FINAL WORK PLAN
VOLUME I

SAN GERMAN GROUNDWATER CONTAMINATION SITE
REMEDIAL INVESTIGATION/ FEASIBILITY STUDY
SAN GERMAN, PUERTO RICO
Work Assignment No: 223-RICO-02YP

U.S. EPA CONTRACT No. EP-W-05-049

May 19, 2010

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May 19, 2010

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PROJECT:	RAC II Region 8 Contract No.: EP-W-05-049 Work Assignment: 223-RICO-02YP
SUBJECT:	Final Work Plan Volume 1 San German Groundwater Contamination Site Remedial Investigation/Feasibility Study San German, Puerto Rico

Dear Mr. Rosado and Mr. Bosque:

CDM Federal Programs Corporation (CDM) is pleased to submit this Final Work Plan Volume 1 for the Remedial Investigation/Feasibility Study (RI/FS) at the San German Groundwater Contamination Site in San German, Puerto Rico.

If you have any comments concerning this submittal, please contact me at (212) 377-4524 or Brendan MacDonald at (787) 722-5410.

Very truly yours,

CDM FEDERAL PROGRAMS CORPORATION

Jeanne Litwin, REM
RAC 2 Program Manager

Attachment

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May 19, 2010

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Contents

Tables

Figures

Appendices

Section 1 Introduction

CDM Federal Programs Corporation (CDM) received Work Assignment 223-RICO-02YP under the Response Action Contract (RAC) II Region 8 to perform a Remedial Investigation/Feasibility Study (RI/FS), including a risk assessment (RA), for the United States Environmental Protection Agency (EPA), Region 2 at the San German Groundwater Contamination site (the San German site) located in San German, Puerto Rico. This work assignment is a crossover from EPA Region 2 and has been issued pursuant to Special Provision H.29, EPA Regional Crossover.

The purpose of this work assignment is to evaluate the nature and extent of groundwater contamination, defined in the EPA Statement of Work (SOW) as a groundwater plume with no identified source(s) of contamination. The RI field investigation will collect sufficient data to minimize subsequent pre-design data collection activities. The media that will be investigated during the RI include soil, groundwater, surface water, and sediment. Data collected during the field investigations will be used to prepare an RI Report, a Baseline Human Health Risk Assessment (HHRA), a Screening Level Ecological Risk Assessment (SLERA), and a Feasibility Study (FS). The FS will develop a full range of remedial alternatives, which will support selection of a remedy and preparation of a Record of Decision (ROD).

1.1 Overview of the Problem

The overview of the San German site is summarized from the Hazard Ranking System (HRS) package prepared by Weston Solutions, Inc. (EPA 2007b). Additional site history and background information is included in Section 2.

The San German site, located in San German, Puerto Rico, consists of a groundwater plume with no currently identified source(s) of contamination. Figure 1-1 is the Site Location Map and Figure 1-2 is the Site Map. San German's public water system, known as San German Urbano, consists of seven groundwater wells and two surface water intakes. Three of these wells, Retiro Well, Lola Rodriguez de Tio I (hereinafter referred to as Lola I) and Lola Rodriguez de Tio II (hereinafter referred to as Lola II), acted as an independent interconnected supply system with approximately 800 service connections serving approximately 2,280 users in 2005. During the period 2001 to 2005, tetrachloroethylene (PCE) and *cis*-1,2-dichloroethylene (*cis*-1,2-DCE) were detected in all three wells. The Puerto Rico Department of Health (PRDOH) ordered the Puerto Rico Aqueduct and Sewer Authority (PRASA) to close Retiro well in January 2006 as a result of the detection of PCE above the federal Safe Drinking Water Maximum Contaminant Level (MCL). PCE was also detected in tap water samples collected from distributed water, and trichloroethylene (TCE) has been detected in Lola I. Lola I and Lola II have also been taken offline.

In July 2006, EPA conducted reconnaissance activities at 44 industrial sites in the San German area as part of a Site Discovery Initiative (SDI) to identify hazardous waste sites that could be potential sources of groundwater contamination. In January 2007, EPA conducted two Preliminary Assessment/Site Inspections (PA/SIs) and one

Expanded Site Inspection (ESI) at properties identified as potential sources of the groundwater contamination. EPA employed direct-push technology and laboratory confirmatory analyses of soil and groundwater samples. Chlorinated volatile organic compounds (VOCs) were detected in surface soil, subsurface soil, and groundwater. However, based on these results, there is insufficient information to conclusively determine the source of contamination of the local public supply wells.

1.2 Approach to the Development of the Work Plan

This work plan divides the field investigation activities into two major portions: the Southern Investigation and the Northern Investigation. The initial focus of the RI, the Southern Investigation, is on identification and confirmation of contaminant sources, with subsequent definition of the nature and extent of contamination impacting the public supply wells south of Rio Guanajibo. The Northern Investigation is comprised of optional tasks to be performed based on contaminant release and migration information and groundwater flow characteristics determined during the Southern Investigation. The need to perform individual optional tasks will be evaluated in concert with EPA. The inclusion of these tasks as options allows EPA flexibility in determining a means to complete RI activities.

The RI will focus on collecting adequate data from appropriate media to characterize the nature and extent of groundwater contamination. Because no source of contamination has been identified at the San German site, the RI also will also investigate potential contaminant sources in the vicinity of the site. The sampling approach is discussed in Section 5. A Quality Assurance Project Plan (QAPP) detailing sample and analytical requirements for the field investigation and a health and safety plan (HSP) will be submitted separately. The RI report will provide a complete evaluation of sampling results.

The risk assessments for the San German site will evaluate the risk from exposure to contaminated media, including groundwater, soil, surface water, and sediment. The HHRA will be conducted according to EPA's Risk Assessment Guidance for Superfund (Part A 1989a and Part D 1998a) or according to the most recent EPA guidance and requirements. The SLERA will be conducted according to EPA's Ecological Risk Assessment Guidance for Superfund (ERAGS), Process for Designing and Conducting Risk Assessments (EPA 1997c) or according to the most current EPA guidance and requirements. The risk assessments will include a list of contaminants of potential concern (COPCs); toxicology of COPCs; transport, degradation, and fate analysis of COPCs; comparison of COPCs to applicable or relevant and appropriate requirements (ARARs); and determination of potential risk.

An FS will be completed in accordance with EPA guidance under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) "Interim Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988), or the most recent EPA FS guidance document. The FS will develop and screen remedial alternatives and provide detailed analysis of selected alternatives, including the "No Action" alternative. The remedial alternatives will be evaluated against the nine criteria required by EPA guidance documents: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume through treatment; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state acceptance; and (9) community acceptance.

1.3 Work Plan Content

This work plan contains nine sections, as described below.

Section 1	Introduction - The introductory section presents the overall approach and the format of the work plan.
Section 2	Site Background and Setting - This section describes the site background, including the current understanding of the location, history, and existing conditions at the site, and a description of previous sampling results.
Section 3	Initial Evaluation - This section presents an initial review of existing data; it includes regional and site geology and hydrogeology, the current Conceptual Site Model (CSM), and a preliminary identification of ARARs.
Section 4	Work Plan Rationale - This section includes the Data Quality Objectives (DQOs) for the RI sampling activities, and the approach for preparing the work plan to satisfy the DQOs.
Section 5	Task Plans - This section presents a discussion of each task of the RI/FS in accordance with the San German site RAC II SOW, EPA guidance documents, and meetings and discussions with EPA.
Section 6	Schedule - The project schedule is presented in this section.
Section 7	Project Management Approach - Project management considerations that define relationships and responsibilities for selected task and project management teams are described.
Section 8	References - The references used to develop material presented in this work plan are listed in this section.
Section 9	Acronyms - The acronyms and abbreviations used in the work plan are defined in this section.

For presentation purposes, work plan figures and tables are presented at the end of this Volume 1 Work Plan.

Section 2
Site Background and Setting

2.1 Site Location and Description

The San German site is located in San German, in southwestern Puerto Rico (see Figure 1-1). The site is defined by VOC detections in three wells - the Retiro, Lola I, and Lola II public supply wells (PSWs) - located south of Rio Guanajibo, between Routes 139 and 360 (see Figure 1-2). These wells are associated with PRASA's San German Urbano Water system, which totals seven wells and two surface water intakes.

Retiro well is located near the intersection of Route 122 and Rio Guanajibo, north of Calle Oriente, along the east side of a narrow, unnamed dirt road that leads to the riverbank. Lola I is situated alongside Calle Oriente, near an entrance to the Lola Rodriguez de Tio public school. Lola II is located approximately 550 feet west-northwest of Retiro and south of Rio Guanajibo, along the south side of an unnamed dirt road along the river. Retiro well, Lola I, and Lola II acted as an independent interconnected supply system with approximately 800 service connections serving approximately 2,280 users in 2005. According to PRASA, the individual mean output for each well in 2005 were approximately 398,000 gallons per day (gpd) from Retiro, 185,000 gpd from Lola I, and 170,000 gpd from Lola II.

An approximately 8 feet (ft) x 10 ft x 11 ft concrete block, slab-on-grade pump house sits alongside each well. Each well and pump house is surrounded by a locked, chain-link fence. Each pump house contains a control panel. The supply pump in Lola I is reportedly the only equipment below the ground surface. A surface water drainage channel runs underneath the Lola I pump house.

2.2 Site History

2001 to 2005 - PRASA Quarterly Groundwater Sampling

Over this period, groundwater samples collected quarterly from the Lola I, Lola II, and Retiro wells regularly exhibited detectable concentrations of PCE and *cis*-1,2-DCE (see Table 2-1). The maximum concentrations of PCE and *cis*-1,2-DCE detected in these wells during this period were 6.4 micrograms per liter (μg/L) and 1.2 μg/L, respectively.

January 17, 2006 – Retiro Well Ordered Closed

The Retiro well was ordered closed by the PRDOH due to PCE concentrations exceeding the federal MCL of 5 μg/L. PRASA responded to this order by taking the Retiro well out of service on January 19, 2006.

June 20, 2006 - EPA Groundwater Sampling

EPA collected groundwater samples from operational wells and analyzed for Target Compound List (TCL) and Target Analyte List (TAL) contaminants via the Contract Laboratory Program (CLP). Groundwater samples collected by EPA in June 2006 confirm the presence of PCE (1.6 μg/L), cis-1,2-DCE (1.5 μg/L), and TCE (0.54 μg/L).

In addition, PCE was detected at an estimated concentration (below the sample quantitation limit [SQL]) in the Lola II well. EPA was unable to collect a sample from the Retiro well because the pump had been removed in February 2006 in response to PRDOH's shutdown order. Samples collected from background El Real well showed non-detects for PCE, cis-1,2-DCE, and TCE.

2.2.1 Previous Investigations

Investigations have been voluntarily undertaken by one private operator at their former facility. Additionally, four previous investigations have been conducted by EPA near the site to identify the source of the groundwater contamination.

2.2.1.1 Hewlett Packard (HP)/PCB Horizon Facility

The PCB Horizon Technology, Inc. (PCB) facility is located on the north side of Route 362 in a commercial/industrial area of San German. The property is owned by the Puerto Rico Industrial Development Company (PRIDCO), who leases the facility to PCB. In July 2006, the facility was inactive and in the process of being disassembled and decommissioned. During this time, the facility had no power; the building was being gutted at the request of PRIDCO. According to the on-site contact, previous occupants of the facility included Digital Equipment Corporation (DEC) (1968-1993), Circo Caribe Corporation (1993-1997), and Via Systems de PR, Inc. (1997-2003). Operations conducted at the facility by all of these companies included the manufacture of printed circuit boards (EPA 2007a).

HP/DEC Voluntary Remediation Program

DEC began to manufacture single and multi-layer printed wire boards at the facility in 1968. Acids, bases, plating solutions, oxidizing agents, reducing chemicals, non-chlorinated solvents, and TCE were used at the site. DEC started using TCE in 1976 as a degreaser in their wave solder process and may have also used TCE as a stripper and as a screen cleaner. DEC discontinued its use in 1978.

In 1992, DEC planned to sell the facility and performed a Phase I Environmental Investigation (EI) which led to a Phase II EI in 1993. During the Phase II EI, TCE was detected in groundwater within the fill, in saprolite (weathered bedrock), and in shallow fractured volcanic bedrock. Dense non-aqueous phase liquid (DNAPL) was also encountered below the water table. Some TCE was detected in soils at the southern loading dock area. In 1994, DEC implemented a voluntary remediation program. In 1995, remedial construction began and was operational in November 1995. Two existing primary extraction wells, W-6 and W-7, and one secondary extraction well, W-1, were used to contain the TCE contaminated groundwater onsite. These wells were believed to be 350 ft below the ground surface (bgs) but the depth was never confirmed by DEC. A secondary soil vapor extraction (SVE) system was installed at the southern loading dock to remediate TCE-contaminated soil in this area.

In 1998, Compaq bought DEC and, in 2000, merged with HP. HP initiated a more comprehensive hydrogeologic investigation at the site over four phases from 2000 to 2002 (GZA 2003). The goals of the investigation were to:

- Improve understanding of the contaminant plume
- Verify containment design
- Improve understanding of site hydrogeology
- Recommend remedial system improvements

Groundwater contamination within the fill, saprolite and shallow bedrock was investigated in the site since it was not fully delineated during the DEC Phase II EI. Groundwater in the fill is generally perched and leaks to the underlying units. Groundwater in the saprolite and bedrock are considered connected and act as one unit.

Extraction well pump tests were conducted to determine if the TCE plume was being captured. The conclusions from the pump tests were that the capture zone created from onsite pumping wells was sufficient to capture groundwater contamination on site and on the neighboring Puerto Rico Electric Power Authority (PREPA) property to the west. The primary extraction well responsible for creating the existing groundwater capture zone is W-6.

The results for the September 2002 sitewide groundwater sampling event, which occurred after the completion of the hydrogeologic investigation, showed one primary area of groundwater contamination within the fill and three areas within the saprolite/bedrock unit. The data are presented as combined TCE/*cis* 1,2 DCE concentrations (Appendix A1).

Fill Unit
The highest concentration of 3500 parts per billion (ppb) was from well OW-101 just east of the Plant Hazardous Waste Storage Area and adjacent to A Street. The second highest was 1,330 ppb from well OW-305I just west of this area.

Saprolite/Bedrock Unit
The three contaminated areas in the saprolite/bedrock include:

- Stormwater Catch Basin Area
- The highest concentration of 560 ppb was from saprolite well WB1L.
- Plant Hazardous Waste Storage Area
- The highest concentration of 200 ppb was from saprolite well GZ-503L.
- Plant Chemical Storage Area
- The highest concentration of 26,400 ppb was from saprolite well OW-304L. The concentration in the bedrock couplet, OW-304R was 5,600 ppb

After the hydrogeological investigation, HP proposed to Puerto Rico Environmental Quality Board (PREQB) a reduced monitoring well sampling program, with semi-annual sampling instead of quarterly and the addition of a new extraction well W-8 to replace W-6. W-6 had problems with biofouling and its efficiency was not optimal. W-8 was installed in 2008 to 350 ft bgs. It is located approximately 300 feet north of the abandoned W-6 between the Plant Chemical Storage Area and the Plant Hazardous Waste Storage Area.

The results for the September 2007 groundwater sampling event (the most recent semi-annual report reviewed) when compared to the 2002 event still showed one primary area for groundwater contamination within the fill and three areas within the saprolite/bedrock unit. Concentrations have decreased over the five year interval. The data are presented as combined TCE/*cis* 1, 2 DCE concentrations (Appendix A2).

Fill Unit
The highest concentration of 900 ppb was from well OW-101 just east of the Plant Hazardous Waste Storage Area and adjacent to A Street. The second highest was 87 ppb from well OW-305I just west of this area.

Saprolite/Bedrock Unit
The three contaminated areas in the saprolite/bedrock include:

- Stormwater Catch Basin Area
- The highest concentration of 130 ppb was from saprolite well WB1L.
- Plant Hazardous Waste Storage Area
- The highest concentration of 73 ppb was from saprolite well GZ-502L.
- Plant Chemical Storage Area
- The highest concentration of 13,000 ppb was from saprolite well OW-304L. The concentration in the bedrock couplet, OW-304R, was 1,100 ppb

The facility is currently operating a groundwater remediation system, utilizing extraction wells to pump contaminated groundwater for treatment prior to discharge under a PRASA permit. Approximately 80,000 gallons per day of contaminated groundwater are pumped for treatment.

2008 Removal Action at PCB Horizon
EPA's Resource Conservation and Recovery Act (RCRA) group conducted a site visit at the PCB Horizon facility in January 2008 and noticed spills onsite. PRIDCO hired Clean Harbors to clean up the two unreported spills from a tank at the Plant Chemical Storage Area. The 9,000 gallon above ground storage tank (AST) is labeled "etchant". The dike system surrounding the tank was not functioning so the leak was uncontrolled. EPA RCRA asked PRIDCO to collect samples from around this AST. EPA's Removal Branch is overseeing the work being performed by Clean Harbors. In Building 2 EPA observed more than 2,000 containers labeled "Sulfuric Acid 98%". Drums were corroded and spilled. This facility is identified as a potential source area (PSA) and CDM will perform additional evaluations as described in Section 5.3.

2.2.1.2 San German Site Discovery Initiative (SDI)
In September 2006, EPA completed a Pre-CERCLIS Screening Report identifying sites in San German for further evaluation under CERCLA. In support of the evaluation, EPA personnel conducted file searches, interviews, and field reconnaissance surveys at 44 sites in July 2006. Seven facilities/sites were identified in the report as areas of concern warranting further action under CERCLA:

- Abandoned Gulf Station (Abandoned Gulf)
- Acorn Cleaners (Acorn)
- Baytex International (Baytex)
- CCL Insertco de PR (CCL)
- Garaje Rodriguez
- Tropical Fruit Products, Inc.
- Wallace International de P.R., Inc. (Wallace)

The report further recommended that each of the sites (with the exception of Tropical Fruit Products, Inc., which was directed to the EPA Removal Program) be investigated to determine the likelihood that each of them could be sources of VOC groundwater contamination.

Additional Facilities
Several other facilities not initially recommended for further evaluation following the SDI have been identified by EPA and CDM as warranting additional evaluation. These properties include:

- Cordis, LLC/OMJ Pharmaceutical (Cordis/OMJ)
- Baxter Worldwide (Baxter)
- Caribe GE Distribution Components, Inc. (GE)

The following sections provide key SDI information and subsequent investigation information for properties at which additional evaluations will be performed.

2.2.1.3 Abandoned Gulf
This facility is situated on the west side of Route 122, north of Rio Guanajibo. The property is in disrepair and reportedly littered with debris typical of a retail petroleum facility (auto parts, drums, etc.). The status of underground storage tanks (USTs) at the facility is unknown. Abandoned Gulf was recommended for further assessment based on observations made during the facility inspection and its proximity to the Retiro well.

On January 25, 2007, EPA conducted a sampling event at Abandoned Gulf. During this event, surface soil, subsurface soil, and groundwater samples were collected from borings advanced by direct-push technology. Analytical results from this sampling event indicated the presence of low estimated concentrations of VOCs associated with petroleum in a boring located north of the former gas station. These included benzene, toluene, ethylbenzene, and xylenes (BTEX). Chlorinated solvents were not detected in soil or groundwater samples collected at the site.

This facility is identified as a PSA at which CDM will perform additional evaluations as described in Section 5.3.

2.2.1.4 Acorn
This facility is situated on the west side of Route 122, just south of Calle Luna. Prior to its initiation as a dry cleaning facility in 1970, Acorn was used for agricultural purposes. A diesel AST and a drum of PCE were observed during EPA's SDI

reconnaissance. Since 1991, the facility's PCE use has reportedly dropped from five to six drums per year to one. Acorn was recommended for further assessment based on its use of PCE since 1970 and the fact that it is situated directly upgradient of the contaminated Retiro well.

On January 26, 2007, EPA conducted a sampling event at Acorn. EPA's PA/SI of Acorn included the collection of surface soil, subsurface soil, and groundwater samples via direct–push technology. Analytical results from this sampling event indicated the presence of PCE at an estimated concentration of 3.1 micrograms per kilogram (µg/kg) in one surface soil sample (0.5–1 ft bgs), located immediately south of the Acorn Cleaners facility. PCE was not detected in groundwater samples collected in association with the Acorn Cleaners site.

This facility is identified as a PSA at which CDM will perform additional evaluation as described in Section 5.3.

2.2.1.5 Baytex

Baytex is situated at the corner of Calle A and Calle B, within Retiro Industrial Park (RIP). Owned by PRIDCO, RIP is situated in a mixed commercial/light industrial/residential area of San German (see Figure 1-2). PRIDCO files indicate that Baytex was involved in the production of clothes and utilized as a raw material warehouse.

Baytex was recommended for further assessment based on the fact that DEC occupied the facility building for 10 years and based on the site's proximity to the Retiro well. To date, no additional investigations under CERCLA have been performed. This facility is identified as a PSA at which CDM will perform additional evaluation as described in Section 5.3.

2.2.1.6 CCL

CCL is located on Calle B within RIP. Currently utilized for the processing of printing label inserts, this facility has also been home to a knitting company and DEC. The facility has one out-of-service UST, no monitoring wells, no septic tanks, and no discharge to PRASA.

CCL was recommended for further assessment based on the fact that DEC previously occupied the facility building and the site's proximity to the Retiro well. To date, no additional investigations under CERCLA have been performed. This facility is identified as a PSA at which CDM will perform additional evaluation as described in Section 5.3.

2.2.1.7 Garaje Rodriguez

An auto body facility has operated for over 45 years at this property located on Calle Luna. Waste paint and solvents are reportedly left in buckets to evaporate. Site runoff flows to a drainage ditch bordering the facility to the south, and a septic system is situated in the southeastern part of the facility.

Garaje Rodriguez was recommended for further assessment based on the facility's use of solvents and paints for over 45 years and the fact that it is situated directly upgradient of the contaminated San German Urbano wells. To date, no additional investigations under CERCLA have been performed. This facility is identified as a PSA at which CDM will perform additional evaluation as described in Section 5.3.

2.2.1.8 Wallace

Location and Description

The Wallace facility currently consists of two buildings on Calle B within RIP. Wallace is bordered on the north, south, and east by other light industrial facilities within RIP and to the west by a topographically upgradient residential area. Wallace previously operated in another building (RIP Building No. S-1404-0-87) on Calle A, northwest of their current facility (see Figure 3, Appendix A-5). Wallace has also been associated with the former I/O Labs - International Silver Building, adjacent to the aforementioned facilities on Calle A (see Figure 3, Appendix A-5).

Portions of the facility are covered by asphalt and concrete. Runoff from the impervious areas and adjacent upgradient areas is believed to flow through the concrete spillway through the storm sewer/drainage network, eventually discharging to Rio Guanajibo. There are no monitoring wells or septic tanks/fields on the facility. One well exists at the current facility, which reportedly has not been used in many years. A connection is maintained at this well for fire suppression purposes; no analytical data exist. PREQB files indicate that the facility has two USTs listed as "permanently out-of-use." One tank contained diesel fuel; however, the database does not indicate the contents of the second tank.

Groundwater beneath the Wallace facility has been recorded in soil borings to be between 14 and 30 ft bgs. Boring logs depict sands with intermittent clay in the overburden. Bedrock was reportedly encountered based on refusal at approximately 30 ft bgs, yet the depth of the subsurface investigation may have been limited by the technology (track-mounted direct-push unit) employed.

Site History

<u>Ownership and Operations</u>

Operations have taken place at the current facility since 1973. According to Wallace personnel, the facility was previously used by another company for the manufacture of softballs. Of note, Wallace previously operated under the name of International Silver de PR, Inc.

Current operations at the facility, performed by 70 employees, include the casting and finishing of sterling silver table flatware. The silverware casting process involves melting sterling silver with copper, forming the alloy into sheets, cutting, coiling, stamping, vibratory polishing, and washing in TCE to remove oil and other surficial contaminants.

The facility employs an internal wastewater recycling system (installed around 1995), which includes a wastewater evaporator used to reclaim silver, and currently discharges only sanitary waste to the PRASA sewer system. Stormwater is discharged under a National Pollutant Discharge Elimination System (NPDES) multi-sector permit with EPA. Wallace holds an air emissions permit (Permit No. PFE-LC-02-64-0496-0045-I-II-O-90-56-E223-MPP) for the evaporator, emergency generator, polishing rooms, and oxidation baths.

During its operational history, the facility has generated spent solvents including PCE, TCE, and 1,1,1-trichloroethane (1,1,1-TCA). Other wastes generated by Wallace include spent corrosive liquids including nitric and sulfuric acids, mercury-containing fluorescent light bulbs, used oil, a dry process sludge that is sent out for recycling, and sludge from a polishing process. Disposal of wastes is currently regulated under Wallace's RCRA Small Quantity Generator (SQG) permit (EPA ID No. PRD090405648). The interior of the facility building includes an acid storage area; dry sludge is staged inside a loading dock pending pick up and recycling.

<u>Release History</u>
Prior to October 1995, Wallace discharged its process wastewater to the PRASA sewer system. PRASA issued a Notice of Violation (NOV) and imposed a fine and surcharges on Wallace for exceeding its discharge limit of 0.05 milligrams per liter (mg/L) for silver in wastewater. Wallace disputed the fine amount, citing efforts and costs associated with upgrading its treatment systems, and subsequently installed its internal wastewater recycling system. In October 2000, Wallace and PRASA reached a settlement, whereby Wallace paid a fine and surcharges but made no admission of liability or violation of its discharge permit.

In August 2006, a drum containing polishing sludge and residuals and stored on the exterior of the facility was observed to be leaking. The impacted soil exhibited silver contamination; however, toxic characteristics leaching procedure analysis indicated concentrations of silver below the regulatory criterion. Caribe Hydroblasting Corporation Environmental Division, on behalf of Wallace, excavated, drummed, and transported the impacted soil to a sanitary landfill for disposal.

2006 SDI Reconnaissance
On July 18, 2006, EPA and PREQB, conducted an on-site reconnaissance and inspection. Both the interior acid storage area and the dry sludge staging area inside the loading dock were observed to be in good condition. At the waste storage area in the rear exterior of the facility, drums of waste TCE and used oil were observed to be stored on asphalt and the ground surface without secondary containment. The asphalt was noted to be discontinuous and in poor condition, with cracks and areas of exposed soil. Several of the drums were rusted, with rain water accumulated on their tops; and one was observed to be bulging. Broken fluorescent light bulbs, a half-buried drum, and spilled oil (with absorbent spread on top) behind a concrete retaining wall were observed. Wallace later reported that sampling of the underlying soils deemed them non-hazardous. Overall housekeeping in the rear exterior was observed to be poor, with overturned empty plastic drums, miscellaneous scrap metal, and trash scattered throughout the area. An active drum storage area consisting of racks within a metal cage was observed to contain four drums of TCE, eight drums of fresh oil, and eight drums of used oil.

Wallace was recommended for further assessment based upon observations of poor condition of storage areas, previous and current use of chlorinated solvents, and proximity to the Retiro well.

2007 ESI

From January 22–24, 2007, EPA conducted an ESI sampling event. Surface soil, subsurface soil, and groundwater samples were collected from borings advanced via direct-push technology on the current Wallace facility, as well as on two other parcels (the Former I/O Labs parcel and the former Wallace International parcel depicted in Figures 2 and 3, Appendix A-5) previously occupied by Wallace. Sampling locations at the current facility were biased towards areas of concern (AOCs) identified during the July 2006 site reconnaissance. Background samples were collected from an adjacent, upgradient property and from the upgradient portion of one of the former Wallace facilities. Samples were analyzed for TCL VOCs and TAL metals (excluding cyanide) through the EPA CLP.

Analytical results from the 2007 ESI sampling event indicate the presence of VOCs including cis-1,2-DCE, PCE, and TCE in soil and groundwater beneath the current Wallace facility (most prevalent at the central portion of the facility, the drum storage area, and the empty drum area near Calle B) and beneath the formerly occupied parcels at concentrations significantly above background. Arsenic and silver were also detected at concentrations significantly above background in Wallace facility soils.

VOCs detected in soil (with maximum values detected in parentheses) included PCE (2,000 µg/kg adjacent to the active drum storage area), TCE (3,300 µg/kg at the central portion of the current facility), cis-1,2-DCE (5,000 µg/kg at the central portion of the current facility), and vinyl chloride (900 µg/kg at the central portion of the current facility). The maximum concentrations of VOCs detected in groundwater included PCE (19,000 µg/L), TCE (2,900 µg/L), cis-1,2-DCE (700 µg/L), and vinyl chloride (150 µg/L), all at the central portion of the current facility. Groundwater samples exhibited contaminant concentrations above background across the entire Wallace facility and at the formerly occupied properties.

RIP is located approximately ½-mile from the contaminated wells, and no groundwater samples have been collected between RIP and the contaminated wells. As a result, the ESI did not identify Wallace as a source of contamination at the site. However, the site has confirmed contamination similar to that in the supply wells and is a PSA at which CDM will perform additional investigation as described in Section 5.3.

2.2.1.9 Cordis/OMJ

Owned by PRIDCO, this eight-building facility is located on Route 362, north of Rio Guanajibo. OMJ uses Building 1 to manufacture a cream for diabetics. Cordis coats and crimps stents in six of the buildings and the two share a laboratory in Building 5.

Two hazardous waste storage facilities are situated along the northern border. During past inspections, the facility has been found to be in compliance with local and federal regulations. The facility holds permits for wastewater discharge (to PRASA), RCRA, and air emissions. Three kerosene spills and one hydraulic oil spill have been recorded at the facility since 1995. The facility has no monitoring wells, no septic tanks, and no USTs.

Based on interviews and documentation reviews suggesting operations are in compliance with applicable rules and regulations, Cordis/OMJ was not recommended for further assessment. To date, no additional investigations under CERCLA have been performed. However, this facility is identified as a PSA at which CDM will perform additional evaluation as described in Section 5.3.

2.2.1.10 Baxter

Since 1995, Baxter has leased from PRIDCO a facility situated on Avenida Baxter, east of Route 22 and south of Route 2. This property was vacant prior to Baxter's occupancy.

Baxter manufactures plasma cell devices and platelet separation products. Baxter holds a RCRA permit for solvent disposal, an air permit from PREQB, and employs an on-site pre-treatment plant for its waste water prior to discharge to PRASA. Storm water is discharged under a NPDES permit. The facility has no monitoring wells or septic tanks, and employs 600 people.

Baxter was not recommended for further assessment, based on good housekeeping and no apparent releases. To date, no additional investigations under CERCLA have been performed. However, this facility is identified as a PSA at which CDM will perform additional evaluation as described in Section 5.3.

2.2.1.11 GE

GE's operations are situated in three buildings at the easternmost end of RIP. GE currently molds and stamps circuit breakers at the facilities. GE has operated in Building 1 since 1969, and Building 3 once was occupied by DEC for training purposes. From 1980 through 1989, the facility generated spent halogenated solvents and ignitable wastes.

A consultant to GE performed a Phase I investigation which recommended performance of a Phase II based on asphalt-like stains. The Phase II detected one slightly elevated concentration of total petroleum hydrocarbons (TPH) in soil in a natural drainage channel, and some lead-based paint in the facility. Water from floor cleaning is transferred to an evaporator, which generates sediment which is at times classified as hazardous.

Based on interviews and documentation reviews suggesting operations were in compliance with applicable rules and regulations, GE was not recommended for further assessment. To date, no additional investigations under CERCLA have been performed. However, this facility is identified as a PSA at which CDM will perform additional evaluation as described in Section 5.3.

2.3 Current Conditions

The San German site is comprised of a groundwater VOC plume identified by contamination found in three San German Urbano public supply wells: Retiro, Lola I, and Lola II. During a site visit in October 2008, CDM visited the three public water supply wells and the sites investigated by EPA in 2006/2007 as potential sources. The three wells looked well maintained; each was accessible within a locked fence. Well piping has been disconnected, as these wells are not currently in operation.

Most facilities considered for walkover surveys and/or investigation are currently active. Wallace, Cordis/OMJ, Baxter, CCL, Acorn, GE and Garaje Rodriguez are all currently active. The former I/O Labs - International Silver parcel and the former Wallace parcel, both considered part of Wallace during the ESI, are inactive. The HP/Compaq facility is inactive except for ongoing remedial activities, including operation and maintenance (O&M) of a groundwater treatment system and removal actions performed under EPA oversight. At the time of the site visit, Clean Harbors Environmental Services were onsite performing activities in support of the removal actions. The Abandoned Gulf and Baytex are currently inactive.

Section 3
Initial Evaluation

3.1 Review of Existing Data
This section summarizes the physical characteristics of the study area including the topography, drainage and surface water characteristics, regional and site-specific geology and hydrogeology, climate, population, and land use. Geological and hydrogeological data and publications pertaining to the San German site were reviewed. Documents were obtained from the United States Geological Survey (USGS), EPA, municipal data, and internet sources.

3.1.1 Topography
San German is located in the eastern part of the Río Guanajibo floodplain. Within the municipality, the river drops from an elevation of approximately 155 feet in the east to approximately 115 feet in the west. The river valley is flanked to the north and south by uplands; the highest point in the area is 735 feet above mean sea level (amsl), at a hilltop 0.75 mile south of the public supply wells. Uplands north of the river range to approximately 280 feet amsl, near the HP and Cordiss facilities. The three public supply wells are located adjacent to the river on the south side, at an approximate elevation of 138 feet amsl.

3.1.2 Drainage and Surface Water
The Río Guanajibo flows west through the town of San German, and is the major surface water body in the area. Readings from USGS staff gauge 50131990, located at the Route 119 overpass, indicate that the average flow rate is approximately 220 cubic feet per second,d and the river depth is approximately 4.5 feet. The Río Guanajibo drainage basin encompasses an area of approximately 35 square miles. (USGS http://waterdata.usgs.gov/nwis). A tributary to the Rio Guanajibo originates in the highlands southeast of the site, and flows west, then north, toward the river, discharging near the northwest corner of the Santa Marta neighborhood. The flow rate and depth of the tributary are not documented.

3.1.3 Geological and Hydrogeological Characteristics
The geological and hydrogeological characteristics of the San German area are described in the following sections. Limited information is available regarding site-specific, and local geology and hydrogeology. Descriptions of geological and hydrogeological characteristics are obtained mainly from a USGS Administrative Report on the *Geology and Hydrogeologic Conditions of the San German Groundwater Contamination Site, Southwestern Puerto Rico* (USGS, no date), and investigation reports at the HP and Wallace facilities.

3.1.3.1 Regional and Site Geology
The area under investigation is located in the municipality of San German in southwestern Puerto Rico. The study area lies within the eastern part of the Río Guanajibo floodplain, which is bounded to the north and south by highlands of predominantly igneous rocks and serpentinite. Bedrock is overlain by alluvial

deposits in the Rio Guanajibo river valley, and is generally encountered at the surface in the highlands, and at depths up to 100 feet bgs in the river valley. Within the wellfield, the serpentinite bedrock is encountered at 30 feet bgs (USGS no date).

The geologic units exposed in the study area or presumed to lie in the subsurface are from youngest to oldest:

- Alluvium Soils (Quaternary) – Alluvial deposits occur in the Rio Guanajibo river valley and along tributaries, and are made up of sand, clay, and gravel. Deposits are generally less than 100 feet thick
- Saprolite – increases in density with depth
- Unnamed Unit of Altered Volcanic Rocks (presumably Cretaceous age)
- Sabana Grande Formation (late Cretaceous age) – consist mainly of andesitic tuff and conglomerate with minor basaltic lava breccias
- Mariquita Chert (late Jurassic and early Cretaceous age) - occurs with rare amygdular basalt and silicified limestone
- Serpentinite or Serpentinized Peridotite (late Jurassic and early Cretaceous age or older) - highly folded and faulted

The extent of alluvial deposits and bedrock are illustrated in Figure 3-1.

3.1.3.2 Regional Hydrogeology

The aquifer within the study area is part of the Río Guanajibo alluvial valley aquifer located in southwestern Puerto Rico. The aquifer is contained predominantly within the poorly to moderately consolidated deposits of sand and gravel of alluvial origin. The colluvial deposits, because of their higher clay and silt content, are less permeable and, thus, poor water-bearing units. The groundwater-bearing potential of the underlying rocks of late Jurassic and Cretaceous age is minimal, except where these units may be highly fractured and weathered (USGS no date).

Groundwater flow occurs under semi-confined and unconfined conditions. Unconfined conditions predominantly occur in the eastern part of the study area, including the suburban areas of San German, where the alluvium is relatively thin and thickness of surficial and subsurface clay and silt is slight. The occurrence of semi-confining conditions within the unconsolidated deposits generally increases west of the town of San German as the depth to basement rock and the thickness of both surficial and subsurface clay and silt strata increase (USGS no date).

3.1.3.3 Site–Specific Hydrogeology

The main aquifer in the vicinity of the site is the unconfined alluvial aquifer within the river valley. Depth to water ranges from river level at the Río Guanajibo to about 15 feet bgs at higher land-surface elevations.

Groundwater Flow

Data regarding groundwater flow in the vicinity of the site are minimal, and therefore flow characteristics can only be assumed. Aquifer drainage is controlled by the relatively impermeable bedrock units that bound the alluvial aquifer along its longitudinal axis. As a result, the general groundwater flow direction in the study area presumably is from the highlands towards the Rio Guanajibo river valley. In general, the predominant movement of groundwater in the Rio Guanajibo alluvial valley upstream from San German should be preferentially toward the course of the Río Guanajibo, with potentiometric water level contours forming a pronounced v-shape upstream. In addition, the tributary streams to the Río Guanajibo likely act as aquifer drains.

Transmissivity

Estimates of the transmissivity of the aquifer within the study area are scarce. Data available indicate that transmissivity is significantly less than in the lower reaches of the Río Guanajibo alluvial valley aquifer due to the reduced thickness of the unconsolidated deposits, and may be in the range of 500 to 1,000 feet squared per day. This range would be equivalent to hydraulic conductivity values in the range of 5 to 15 feet per day. The higher values are in the alluvial sands and gravels in the narrows near San German (USGS no date).

Aquifer Recharge and Discharge

The net recharge to the aquifer within the study area is entirely from infiltration of rainfall. Annual net recharge to the aquifer within the study area may be less than one inch per year (about 0.77 inch per year) as estimated from 7Q10 values obtained in the vicinity of Sabana Grande to San German from studies conducted in the early 1990s. 7Q10 is defined as streamflow that occurs over 7 consecutive days and has a 10 year recurrence interval period, or a 1 in 10 chance of occurring for 7 consecutive days in any one year. Daily streamflows in the 7Q10 range are general indicators of prevalent drought conditions, which normally cover large areas. The 7Q10 values are also used by the Commonwealth of Puerto Rico for regulating water withdrawals and discharges into streams (USGS no date).

Discharge from the aquifer within the study area is to public supply wells, seepage to the Río Guanajibo, and evapotranspiration. Water for human use is provided by public supply sources operated by PRASA, but as of December 2006, the PRASA wells are inactive. However, withdrawals from public supply wells in the vicinity of San German may have been as much as 430,000 gallons per day from the PRASA public supply water wells Lola I, Lola II, and Retiro. As of 2006, there is no reported ground-water withdrawal for agricultural use in the study area and there are no known privately owned wells within the study area for domestic use.

The source of some Retiro public supply well water, if not all, may be induced streamflow from the Río Guanajibo, due to its proximity to the stream and limited aquifer storage. The same conditions apply to the now inactive Lola I and II public supply wells. According to a PRASA field technician, these two public-supply wells were taken out of service because of very low yields. Possibly, the yield to these wells declined as a result of lowering of the streambed as part of the flood channelization works in the Rio Guanajibo, draining permeable sand and gravel deposits near the wells, thus reducing the transmissivity in the saturated zone. Withdrawals from wells in close proximity to streams initially come from bank storage or the regional groundwater flow system, but with increasing pumping time, induced streamflow becomes the primary source of water to the wells (USGS no date).

3.1.4 Climate

The climate for San German, which is located in southwestern Puerto Rico, is classified as tropical humid and is moderated by the nearly constant trade winds that originate in the northeast. The average annual maximum and minimum temperature for the San German area is 89.4 ^{o} Fahrenheit (F) and 64.5 ^{o} F, respectively. Precipitation data from 1971 to 2000 recorded at the San German 668757 rainfall station shows an annual precipitation of 47.11 inches as reported on the Southeast Regional Climate Center website: <http://www.dnr.sc.gov/climate/sercc/climateinfo/historical/historical_pr.html>. CDM will obtain both historical and current climate data, including, but not limited to, temperature, precipitation, and wind speed and direction, from local meteorological stations. Climatic data will be collected during the course of the field investigation and will be incorporated in the RI report.

3.1.5 Population, Land Use and Hazardous Waste Sites

The San German site is located within the San German municipality in southwestern Puerto Rico. The San German municipality is comprised of 54.51 square miles with a population of 37,105 and a population density of 680.7 people per square mile (U.S. Census 2000). The primary land use in the vicinity of the San German site is agricultural with some residential, commercial, and light industrial development.

The population currently served by the four PRASA supply wells is 14,000 people (EPA 2007b).

In addition to the San German site, three sites in the area are listed in EPA's CERCLIS Hazardous Waste Sites database, as follows:

- Abandoned Gulf Station - CERCLIS ID No. PRN000205925
- Acorn Cleaners - CERCLIS ID No. PRN000205926
- Digital Equipment Corporation - CERCLIS ID No. PRD991291857

No National Priority List (NPL) sites except the San German site, are located within four miles of the site.

3.1.6 Characteristics of Chemical Contaminants

The groundwater contamination is characterized by detections of PCE, TCE, and cis-1,2-DCE, as discussed in Section 2.2 of this work plan.

3.1.7 Conceptual Site Model

The CSM was developed based on information collected such as previous investigations and geology, hydrogeology, and hydrologic investigations. It will be updated to integrate the different types of information collected during the RI, including geology, hydrogeology, site background and setting, and the fate and transport of contaminants associated with the site. Figure 3-2 depicts the current CSM for the San German site.

Physical Setting with Respect to Groundwater Movement
All of the groundwater in the San German area is derived from precipitation. The volume of water that percolates down to the water table and recharges the groundwater is the residual of the total precipitation not returned to the atmosphere by evapo-transpiration or lost by runoff to the surface water drainage systems.

San German is located in the southeast-northwest trending Rio Guanajibo alluvial valley surrounded to the north and south by hilly terrain. Aquifer drainage is controlled by the relatively impermeable bedrock units that bound the alluvial aquifer along its longitudinal axis. As a result, the general groundwater flow direction in the study area presumably flows from the highlands towards the Rio Guanajibo river valley. In general, the predominant movement of groundwater in the Rio Guanajibo alluvial valley upstream from San German should be preferentially toward the course of the Río Guanajibo, with potentiometric water level contours forming a pronounced v-shape upstream. In addition, the tributary streams to the Río Guanajibo likely act as aquifer drains. Since the shutdown of the public supply wells, it is possible that the groundwater flow regime may have changed and contaminant flow may no longer be drawn toward the public supply wells.

Potential Contaminant Sources
The site consists of a groundwater plume with no identified source(s) of the contamination. Groundwater sampling at the site detected PCE in the PRASA public supply wells at concentrations ranging from 0.6 µg/L to 6.4 µg/L. Related chlorinated solvents, including cis 1,2-DCE and TCE were also detected at 1.5 µg/L and 0.54 µg/L, respectively.

EPA identified three facilities as potential contaminant sources for the VOC groundwater contamination at the San German site. The facilities are: Wallace, Acorn, and Abandoned Gulf Station. Soil sampling was performed at these sites. Another facility, PCB Horizon/HP, is located north of the river and is currently under a RCRA Corrective Action. The following briefly describes investigations performed at these facilities.

Wallace
From January 22–24, 2007, EPA conducted a sampling event at the Wallace facility. During this event, surface soil, subsurface soil, and groundwater samples were collected from borings advanced by direct-push technology. Borings were advanced on the current Wallace facility, as well as on two other parcels previously occupied by Wallace. Analytical results from this sampling event indicated the presence of VOCs in soil and groundwater beneath the facility. VOCs detected in soil included PCE (up to 2,000 µg/kg), TCE (up to 3,300 µg/kg), cis-1,2-DCE (up to 5,000 µg/kg), and vinyl chloride (up to 900 µg/kg). VOCs detected in groundwater included PCE (up to 19,000 µg/L), TCE (up to 2,900 µg/L), cis-1,2-DCE (up to 700 µg/L), and vinyl chloride (up to 150 µg/L).

Acorn
On January 26, 2007, EPA conducted a sampling event at the Acorn facility. During this event, surface soil, subsurface soil, and groundwater samples were collected from

borings advanced by direct-push technology. Analytical results from this sampling event indicated the presence of PCE in one surface soil sample (depth: 0.5–1 ft bgs), located immediately south of the Acorn facility. PCE was detected in this sample at an estimated concentration of 3.1 µg/kg. PCE was not detected in groundwater samples collected in association with the Acorn site.

Abandoned Gulf Station
On January 25, 2007, EPA conducted a sampling event at the Abandoned Gulf Station. During this event, surface soil, subsurface soil, and groundwater samples were collected from borings advanced by direct-push technology. Analytical results from this sampling event indicated the presence of low estimated concentrations of VOCs associated with petroleum (BTEX) in a boring located north of the former gas station. Chlorinated solvents were not detected in soil or groundwater samples collected at the site.

PCB Horizon/HP
EPA RCRA files indicate that previous investigations conducted at the facility include a RCRA Facility Assessment and RCRA Facility Investigation. These investigations identified the presence of contaminated soil and groundwater under the site. Contaminants included chlorinated ethenes and petroleum hydrocarbons. TCE was detected in groundwater beneath the site in concentrations as high as 25,000 µg/L. Under EPA oversight, Digital proceeded to remedy the soil and groundwater contamination as a voluntary Interim Measure following requirements of the RCRA Corrective Action process. The facility is currently operating a ground water remediation system, where extraction wells pump contaminated groundwater for treatment prior to discharge under a PRASA permit. Approximately 80,000 gallons of contaminated groundwater per day are pumped for treatment. The system is operated by HP (formerly Compaq Corporation; formerly Digital Equipment Corp.). The system is currently in operation.

Expected Transport and Fate of Site Contaminants
Groundwater
Liquid chlorinated solvents such as PCE and TCE, discharged to the ground surface would migrate downward through the unsaturated zone in a relatively linear pattern, with minimal dispersion from the discharge location. This will generally be the pattern when sand and gravel predominate beneath the source areas. In parts of the alluvium where clays are present beneath the potential source areas, migration of the liquid solvents could be complicated. Discharged solvents would migrate downward to the top of the clay unit, pool, then begin to migrate across the surface of the clay until a gap in the clay is encountered and then migrate through coarser sediments to the groundwater table. The unsaturated zone is approximately 14 to 30 feet thick in the San German site area.

Once the liquid chlorinated solvents, such as PCE and TCE, encounter the water table, some of the solvent would dissolve into the groundwater and begin to move in the direction of groundwater flow toward the Rio Guanajibo. If the quantity of solvent reaching the water table is sufficient, some of the solvent may remain in an undissolved state as DNAPL. Since PCE and TCE are denser than water, the solvent would continue to move downward through sand and gravel sediments under the influence of gravity. DNAPL would sink until it encountered a lower permeability zone, such as a clay layer or the bedrock surface, which would slow or stop the downward migration. DNAPL could pool or accumulate on these low permeability zones and remain stationary. Chlorinated solvents such as PCE and TCE in a dissolved phase move with the groundwater flow, but generally at a slower rate than groundwater. The full extent of contamination in the aquifer is currently unknown.

Natural attenuation of chlorinated solvents is a documented process, with PCE breaking down through a known decay chain of compounds, with daughter products including TCE, cis-1,2-DCE and vinyl chloride (Vogel et al 1987). Breakdown of chlorinated solvents occurs most prominently under anaerobic conditions. It is currently unknown if the site aquifers are aerobic or anaerobic.

Air

PCE and TCE are volatile organic chemicals. As such, they volatilize to the atmosphere and, in the unsaturated soil zone, to the pore spaces between soil particles. Volatile chemicals dissolved in groundwater also volatilize into the overlying unsaturated zone as a plume moves downgradient with the groundwater flow. Vapors move through the unsaturated zone pore spaces, often seeking preferential flow pathways such as sandier zones with more porosity and permeability, gravel commonly placed beneath concrete basements, or pipelines that may be backfilled with sandy material. As vapors move through the unsaturated zone, they can enter structures, such as homes, affecting air quality. Vapor movement may also be affected by differential pressure gradients, either natural (e.g., caused by weather changes) or man-made (e.g., pressure differences inside and outside structures).

Surface Water/Sediment

Groundwater may discharge into surface water bodies, including Rio Guanajibo, and several other smaller streams. Therefore, the potential exists for contamination from the groundwater to affect the quality of surface water and/or sediments at (or downgradient from) the discharge points. The groundwater flow direction has not been adequately characterized at this time, but in the vicinity of the VOC impacted wells, it is expected to discharge into Rio Guanajibo. Contaminated surface water and/or sediment could result in exposure to people utilizing the river or streams, or to ecological resources such as aquatic organisms or animals that frequent the habitat at the edge of water bodies. In addition, chemicals could enter the food chain, resulting in ecological exposure to higher levels of the food chain.

3.2 Preliminary Identification of Applicable or Relevant and Appropriate Requirements

This section provides a preliminary determination of the regulations that are applicable or relevant and appropriate to remediation of the groundwater at the San German site. Both federal and Commonwealth environmental and public health requirements are considered. In addition, this section identifies federal and

Commonwealth criteria, advisories, and guidances that could be used to evaluate remedial alternatives. Only those regulations that are considered relevant to the site are presented.

3.2.1 Definition of ARARs

The legal requirements that are relevant to the remediation of the site are identified and discussed using the framework and terminology of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA). These acts specify that Superfund remedial actions must comply with the requirements and standards of both federal and Commonwealth environmental laws.

The EPA defines applicable requirements as "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or Commonwealth environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site". An applicable requirement must directly and fully address the situation at the site.

The EPA defines relevant and appropriate requirements as "those cleanup standards, standards of control, or other substantive requirements, criteria, or limitations promulgated under federal environmental or Commonwealth environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site".

Remedial actions must comply with Commonwealth ARARs that are more stringent than federal ARARs. Commonwealth ARARs are also used in the absence of a federal ARAR, or where a Commonwealth ARAR is broader in scope than the federal ARAR. In order to qualify as an ARAR, Commonwealth requirements must be promulgated and identified in a timely manner. Furthermore, for a Commonwealth requirement to be a potential ARAR it must be applicable to all remedial situations described in the requirement, not just CERCLA sites.

ARARs are not currently available for every chemical, location, or action that may be encountered. For example, there are currently no ARARs which specify clean-up levels for sediments. When ARARs are not available, remediation goals may be based upon other federal or Commonwealth criteria, advisories and guidance, or local ordinances. In the development of remedial action alternatives the information derived from these sources is termed "To Be Considered" (TBC) and the resulting requirements are referred to as TBCs. EPA guidance allows clean-up goals to be based upon non-promulgated criteria and advisories such as reference doses when ARARs do not exist, or when an ARAR alone would not be sufficiently protective in the given circumstance.

By contrast, there are six conditions under which compliance with ARARs may be waived. Remedial actions performed under Superfund authority must comply with ARARS except in the following circumstances: (1) the remedial action is an interim measure or a portion of the total remedy which will attain the standard upon completion; (2) compliance with the requirement could result in greater risk to human health and the environment than alternative options; (3) compliance is technically impractical from an engineering perspective; (4) the remedial action will attain an equivalent standard of performance; (5) the requirement has been promulgated by the Commonwealth, but has not been consistently applied in similar circumstances; or (6) the remedial action would disrupt fund balancing.

ARARs and TBCs are classified as chemical, action, or location specific. Descriptions of these classifications are provided below:

- Chemical-Specific ARARs or TBCs are usually health or risk-based numerical values, or methodologies which when applied to site specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment
- Location-Specific ARARs or TBCs generally are restrictions imposed when remedial activities are performed in an environmentally sensitive area or special location. Some examples of special locations include flood plains, wetlands, historic places, and sensitive ecosystems or habitats
- Action-Specific ARARs or TBCs are restrictions placed on particular treatment or disposal technologies. Examples of action-specific ARARs are effluent discharge limits and hazardous waste manifest requirements

3.2.2 Preliminary Identification of ARARs and TBCs

The identification of ARARs occurs at various points during the RI/FS and throughout the remedial process. ARARs are used to determine the extent of cleanup, to scope and formulate remedial action alternatives, and to govern the implementation of the selected alternative.

The following are preliminary ARARs that may impact the selection of remedial alternatives for various environmental media at the site. This preliminary list of ARARs is based on current site knowledge and will be reviewed and updated during the RI/FS processes. Periodic review of the preliminary list of ARARs will assure that the ARARs remain applicable, as more site-specific information becomes available, and as new or revised ARARs are established.

3.2.2.1 Chemical-Specific ARARs

The determination of potential chemical-specific ARARs and TBCs for a site typically follows an examination of the nature and extent of contamination, potential migration pathways and release mechanisms for site contaminants, the presence of human receptor populations, and the likelihood that exposure to site contaminants will occur. The potential chemical-specific federal and Commonwealth ARARs for the site are as follows:

Federal:

- RCRA Groundwater Protection Standards and Maximum Concentration Limits (40 Code of Federal Regulations (CFR) 264, Subpart F)
- Clean Water Act, Water Quality Criteria (Section 304) (May 1, 1987 - Gold Book)
- Safe Drinking Water Act, Maximum Contaminant Levels (40 CFR 141.11-.16) issued July 1, 1991 and amended in the Federal Register 40 CFR Part 141 issued June 29, 1995. These levels include secondary MCLs, which are not enforceable but set standards for taste, odor, color, appearance, and other aesthetic factors that may affect public acceptance of water

Commonwealth:

- Puerto Rico Water Quality Standards - PREQB, Water Quality Standards Regulation, March 28, 2003)
- PRDOH National Primary Regulations of Potable Water, March 1992
- PRDOH General Regulation for Environmental Health, Regulation No. 6090, February 4, 2000

3.2.2.2 Location-Specific ARARs

The location of the site is a fundamental determinant of its impact of human health and the environment. Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in a specific location (EPA 1988). Some examples of these unique locations include: flood plains, wetlands, historic places, and sensitive ecosystems or habitats. The potentially applicable federal and Commonwealth location-specific ARARs for the site are as follows:

Federal:

- Executive Order on Wetlands Protection (CERCLA Wetlands Assessments) No. 11990
- National Historic Preservation Act (16 United States Code [USC] 470) Section 106 et seq. (36 CFR 800)
- Endangered Species Act of 1973 (16 USC 1531) (Generally, 50 CFR Part 402)
- RCRA Location Requirements for 100-year Flood Plains (40 CFR 264.18(b))
- Fish and Wildlife Coordination Act (16 USC 661 et seq.)
- Wetlands Construction and Management Procedures (40 CFR 6, Appendix A)
- Executive Order 11988, "Floodplain Management"
- Executive Order 11990, "Protection of Wetlands"
- 1985 Statement of Policy on Floodplains/Wetlands Assessments for CERCLA Action

Commonwealth:

- Puerto Rico EQB, Guidelines for Environmental Impact Statements
- Puerto Rico Department of Natural and Environmental Resources, Critical Element and Endangered Species Database, 1998

3.2.2.3 Action-Specific ARARs

Based on the identification of remedial response objectives and applicable general response actions, numerous federally promulgated action-specific ARARs and TBCs will affect the implementation of remedial measures and include administrative requirements related to treatment, storage and disposal actions.

The primary federal requirements which guide remediation are those established under CERCLA, as amended by SARA. The National Contingency Plan (NCP) incorporates the SARA Title III requirement that alternatives must satisfy ARARs and utilize technologies that will provide a permanent reduction in the toxicity, mobility or volume of wastes, to the extent practicable.

RCRA establishes both administrative (e.g., permitting, manifesting) requirements and substantive (i.e., design and operation) requirements for remedial actions. For all CERCLA actions conducted entirely onsite, only the substantive requirements apply. The potentially applicable federal and Commonwealth action-specific ARARs are as follows:

Federal:

- RCRA Subtitle C Hazardous Waste Treatment Facility Design and Operating Standards for Treatment and Disposal Systems, (i.e., landfill, incinerators, tanks, containers, etc.)(40 CFR 264 and 265) (Minimum Technology Requirements)
- RCRA Ground Water Monitoring and Protection Standards (40 CFR 264, Subpart F)
- RCRA Manifesting, Transport and Recordkeeping Requirements (40 CFR 262)
- RCRA Wastewater Treatment System Standards (40 CFR 264, Subpart X)
- RCRA Storage Requirements (40 CFR 264; 40 CFR 265, Subparts I and J)
- RCRA Subtitle D Nonhazardous Waste Management Standards (40 CFR 257)
- Toxic Substances Control Act (TSCA)(40 CFR 761)
- Clean Water Act - NPDES
- Permitting Requirements for Discharge of Treatment System Effluent (40 CFR 122-125)
- Clean Water Act Discharge to Publicly Owned Treatment Works (POTW) (40 CFR 403)
- National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR 61)
- Occupational Safety and Health Standards for Hazardous Responses and General Construction Activities (29 CFR 1904, 1910, 1926)
- Fish and Wildlife Coordination Act (16 UC 661 et seq.). (Requires actions to protect fish or wildlife when diverting, channeling or modifying a stream)
- National Primary and Secondary Ambient Air Quality Standards (40 CFR Part 50)
- The Endangered Species Act

Commonwealth:

- Puerto Rico General Requirements for Permitting Wells
- Puerto Rico EQB, regulation for the Control of Atmospheric Pollution, 1995
- Puerto Rico EQB, Regulation for the Control of Hazardous and Non-Hazardous Waste, 1982 as amended, 1985, 1986 and 1987
- Puerto Rico EQB, Underground Storage Tank Control Regulations, 1990
- Puerto Rico EQB, underground Injection Control Regulations, 1988

3.2.2.4 To Be Considered

When ARARs do not exist for a particular chemical or remedial activity, other criteria, advisories and guidance (TBCs) may be useful in designing and selecting a remedial alternative. The following criteria, advisories and guidance were developed by EPA, other federal agencies and Commonwealth agencies. The potentially applicable federal and Commonwealth TBCs are as follows:

Federal TBCs (Action, Location, and Chemical-Specific):

- Safe Drinking Water Act National Primary Drinking Water Regulations, Maximum Contaminant Level Goals (MCLGs)
- National Recommended Water Quality Criteria, EPA 2006b
- Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario - Lowest Effect Level (LEL) and Severe Effects Level (SEL) (Ontario 1993)
- EPA Regional Screening Levels (SLs), EPA September 2008
- EPA Drinking Water Health Advisories
- TSCA Health Data
- Policy for the Development of Water-Quality-Based Permit Limitations for Toxic Pollutants (49 CFR 8711)
- Ground Water Classification Guidelines
- Ground Water Protection Strategy
- Fish and Wildlife Coordination Act Advisories
- Control of Air Emissions from Superfund Air Stripper at Superfund Groundwater Sites (OSWER Directive 9355.0-28)
- Draft Guidance for Evaluation of the Vapor Intrusion to Indoor Air Pathway, EPA 2002

Commonwealth TBCs (Action, Location, and Chemical-Specific):

- Puerto Rico EQB, Guidelines for Environmental Impact Statements
- PREQB, Soil Erosion Control and Sediment Prevention Regulation
- Puerto Rico EQB, Mixing Zone and Bioassay Guideline, 1988
- Puerto Rico Departmental of Natural and Environmental Resources, Critical Element and Endangered Species Database, 1998

Section 4
Work Plan Rationale

4.1 Data Quality Objectives

DQOs are qualitative and quantitative statements which specify the quality of data required to support decisions regarding remedial response activities. DQOs are based on the end uses of the data collected. The data quality and level of analytical documentation necessary for a given set of samples will vary, depending on the intended use of the data.

As part of the work plan scoping effort, site-specific remedial action objectives were developed. Sampling data will be required to evaluate whether or not remedial alternatives can meet the objectives. The intended uses of these data dictate the data confidence levels. The document *Guidance on Systematic Planning using the Data Quality Objectives Process* (EPA 2006) was used to determine the appropriate analytical levels necessary to obtain the required confidence levels. The three levels are screening data with definitive level data confirmation, definitive level data, and field measurement-specific DQO requirements (Table 4-1).

The applicability of these levels of data will be further specified in the QAPP. Sampling and analytical data quality indicators (DQIs) such as precision, accuracy, representativeness, comparability, completeness, and sensitivity will also be defined in the QAPP.

4.2 Work Plan Approach

The HRS (EPA 2007b) indicates that the San German site consists of a contaminated aquifer without an identified source. VOC contamination has been detected in three PRASA public supply wells in the San German well field. EPA conducted reconnaissance efforts at 44 potential sites of interest and performed further investigation at 3 potential sources in the site vicinity. Limited soil and groundwater samples were collected from the PSAs and analyzed for VOCs. Results of the sampling suggested the PSAs near the site warranted further investigation. Based on these results and discussions with EPA at the technical scoping meeting held on October 15, 2008, the technical approach developed in this work has two primary objectives:

- Identify the source or sources of the groundwater contamination
- Define the nature and extent of contamination in site media including groundwater, soils, surface water, and sediments

This work plan defines the field investigation activities that will provide data to meet these primary objectives. The field investigation activities also will provide adequate data to support preparation of technical memoranda, an RI report, an HHRA, a SLERA, an FS and a ROD. The data will also be used to support EPA's efforts to identify potentially responsible parties (PRPs). Both screening-level and definitive-level data will be used to support the objectives of this RI/FS.

4.2.1 Development of the Technical Approach

A review of previously collected data indicated that significant data gaps exist in the understanding of the nature and extent of groundwater contamination and contaminant sources. Therefore the CSM, a significant element used to develop the field investigation, is very limited. CDM reviewed existing data, which is summarized in Sections 2 and 3. The review indicated that there is limited or no information in the following areas:

- Source Areas - Information on contaminants present in PSAs including industrial properties, gas stations, dry cleaners, and any newly discovered potential sources
- Groundwater Flow - Lateral and vertical groundwater flow in the overburden and bedrock aquifers at the site
- Stratigraphy - Depth and nature of overburden and bedrock including locations of water bearing zones, degree of fracturing, and fracture orientation
- Contamination - Nature and distribution of VOC contamination within the overburden and bedrock aquifer
- Pumping Effects - Effects of local pumping on groundwater flow
- Groundwater/Surface Water Interaction - Relationship between groundwater and surface water in the vicinity of the Rio Guanajibo

The key consideration in developing the field investigation for the San German Site is that a contaminant source has not been identified (EPA 2007b). Historical sampling information indicated a number of potential sources in the area including industrial properties to the east of the PRASA supply wells (Retiro Industrial Park), a dry cleaning establishment near the PRASA supply wells and industrial properties north of the Rio Guanajibo. The PSA properties to be investigated include:

Retiro Industrial Park Area:

- Wallace (includes Former Wallace and Former International Silver), Baytex, CC Label, Garaje Rodriguez, and GE

North of the river:

- Cordis/OMJ, Baxter, Abandoned Gulf and HP

Others:

- Acorn

As stated above, CDM presented a preliminary technical approach at the technical scoping meeting to obtain input from EPA stakeholders. A meeting minutes letter summarizing changes to the initial technical approach was prepared and submitted to EPA. Input from the technical scoping meeting is incorporated into this work plan.

CDM's technical approach includes elements from EPA's Triad approach guidance. The Triad approach is a conceptual and strategic framework that explicitly recognizes the scientific and technical complexities of site characterization, risk estimation, and treatment design. CDM will employ dynamic sampling plans that will utilize quick turn-around data and joint decision making. This will allow subsequent sampling to be targeted, allowing optimized data collection with the most efficient use of resources.

In order to execute this field program using the approach described above, field tasks will be completed sequentially with each step being completed and data evaluated concurrently, to allow the next portion of the field program to begin. This provides flexibility to focus the investigations on PSAs in the early stages of the investigation. This approach will require frequent communication and coordination among EPA, the CDM Site Manager (SM), Field Team Leader (FTL), and property owners. During these critical periods, CDM will evaluate the quick turnaround time (TAT) data and communicate the results to EPA on a daily basis.

Field investigation activities are detailed in Section 5 of this report. The major elements of the field investigation and the purpose they serve are outlined below.

PSA Inspections: Field activities will focus on surveys of industrial PSAs in the site vicinity. Site surveys and interviews will be performed at the PSAs listed above, and any other PSAs that may be identified in the site area. The reconnaissance activities will allow CDM to target the field investigations toward PSAs that are likely contributors to the groundwater contamination.

Existing Well Investigation: CDM will locate, inspect, survey, and sample existing supply, residential and monitoring wells in order to provide information on existing contamination and groundwater flow characteristics. These data will be used to refine PSA investigations, groundwater screening, and monitoring well locations.

PSA Investigations: Field activities include collection of soil and groundwater screening samples in the overburden to determine the presence of residual contamination at the PSAs identified during the PSA reconnaissance. The data collected will provide information to support identification of PRPs and to select groundwater screening locations and eventually monitoring well locations.

Groundwater Screening Investigation: Field activities consist of groundwater screening sampling to locate and delineate contamination in the overburden aquifer that may have migrated from the PSAs downgradient to the Rio Guanajibo and the PRASA well field. Soil samples will also be collected at selected screening locations to obtain preliminary information on aquifer lithology and stratigraphy. The data generated will provide preliminary information on the vertical and horizontal characteristics of the overburden groundwater contamination and will also aid in selecting final monitoring well locations.

Monitoring Well Installation Program: Multi-port and conventional wells will be installed at the site in the overburden and bedrock aquifers. In order to install well screens and ports at optimal depths, additional field activities such as downhole geophysical logging, borehole hydraulic testing and initial packer sampling were selected to provide information on the geometry and lithology of the bedrock aquifer, groundwater flow, and preliminary information on contaminant distribution (both vertical and horizontal) within the aquifer. Wells installed during this program will support the subsequent hydrogeological investigation.

Hydrogeological Investigation: A surface water and sediment investigation and a surface water/groundwater interaction study will provide data to evaluate potential impacts of the discharge of contaminated groundwater to the Rio Guanajibo. Long-term water level monitoring and hydraulic testing will provide data to evaluate the effects of pumping on the aquifer, define aquifer hydraulic characteristics and the potential connection between the PRASA well field and source areas.

4.2.2 Sustainable Remediation

During the planning process and throughout the RI/FS process, CDM will identify opportunities to implement sustainable remediation practices and enhance sustainable performance. The basic framework of sustainable performance focuses on integrating three primary benefits of sustainable practices: environmental benefits, economic benefits, and community benefits – often referred to as the "triple bottom line". Examples of the goals of implementing sustainability in the RI/FS include: cost effectiveness, recycling and reuse of materials, energy efficiency, waste reduction and minimization, land and water reuse, community outreach, and stakeholder involvement. CDM has established a sustainable management system (SMS) to implement and monitor sustainable performance. The SMS will be used during the RI/FS process to establish sustainable goals and to monitor performance.

Examples of sustainable practices that will be used during the field investigation program include:

- Use of drilling technologies that minimize waste generation and fuel consumption
- Minimize fuel consumption for travel by using local resources when possible
- Recycling glass, paper, and cardboard waste generated during the field program
- Consolidating shipment of materials and supplies to minimize fuel consumption
- Effectively managing energy usage in the field trailer

4.2.3 Anticipated Laboratory Analysis

The CDM field team will collect environmental samples in accordance with EPA-approved rationale, procedures, and protocols provided in the project-specific QAPP. Standard EPA sample collection and handling techniques will be used. Routine

Analytical Services (RAS) samples will be analyzed in compliance with the Field and Analytical Services Teaming Advisory Committee (FASTAC) Policy. CDM will pursue the use of the CLP or Division of Environmental Science and Assessment (DESA) prior to engaging in a laboratory subcontract and alternatives to standard CLP analysis will be sought with the EPA Regional Sample Control Coordinator (RSCC), prior to any sample collection activities and analyses via a subcontracted laboratory. Under the "flexibility clause" of the CLP, modifications are often made to CLP SOWs, enabling achievement of method detection limits (MDLs) that may meet the stated criteria.

CDM will implement the EPA Region 2 policy described below:

Tier 1: DESA Laboratory (including Environmental Services Assistance Team (ESAT) support)
Tier 2: EPA CLP
Tier 3: Region specific analytical services contracts (use CLP flexibility clause)
Tier 4: Obtaining analytical services using subcontractors via field contracts (such as RAC subcontractors)

All fixed laboratory analytical needs will be submitted to the EPA RSCC regardless of the ability of the EPA or CLP laboratory to perform the required analyses. CDM will utilize the RAC II basic ordering agreement (BOA) to obtain subcontract laboratory services only in the event that the first three tiers are not available.

The RAS analytical results will be validated by EPA. CDM will validate all non-RAS data, except data that is analyzed and validated by DESA. CDM will then tabulate all data collected during the field investigation activities and use it to characterize the nature and extent of contamination. Once the nature and extent of contamination is defined, the screening of appropriate alternatives will begin.

Section 5
Task Plans

The tasks identified in this section correspond to EPA's SOW for the San German site, dated September 25, 2008. The tasks for the RI/FS presented below correspond to the applicable tasks presented in the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA 1988). In addition, EPA's SOW includes a task for project close-out. The task presentation order and numbering sequence correspond to the work breakdown structure provided in EPA's SOW.

5.1 Task 1 RI/FS Work Planning

The project planning task generally involves several subtasks that must be performed in order to develop the plans and the corresponding schedule necessary to execute the RI/FS. These subtasks include project administration, conducting a site visit, performing a review and detailed analysis of existing data, attending technical scoping meetings with EPA and other support agencies, preparing this RI/FS work plan, preparing the QAPP and HSP, and procuring and managing subcontractors.

5.1.1 Project Administration

The project administration activity involves regular duties performed by the CDM SM and the Program Support Office (PSO) throughout the duration of this work assignment. CDM will provide the following project administration support in the performance of this work assignment.

The SM will:

- Prepare the technical monthly report
- Review weekly financial reports
- Review and update the project schedule
- Attend quarterly internal RAC II meetings
- Communicate regularly with the EPA Remedial Project Manager (RPM)
- Prepare staffing plans

The PSO personnel will:

- Review the work assignment technical and financial status
- Review the monthly progress report
- Provide technical resource management
- Review the work assignment budget
- Respond to questions from the EPA project officer (PO) and contracting officer (CO)
- Prepare and submit invoices

5.1.2 Attend Scoping Meeting

Following the receipt of this work assignment on October 15, 2008, CDM's Program Manager, SM, and RI Task Manager (RITM) attended an initial scoping meeting with the EPA PO, RPM, Deputy Project Officer, Pre-Remedial Section Chief, and Pre-Remedial Project Manager in New York to outline and discuss the project scope. A technical scoping meeting was held on November 24, 2008 at the EPA Region 2 offices in San Juan, Puerto Rico and New York, New York. The meeting was attended by CDM personnel, including the Program Manager, SM, RITM, Risk Assessor, Project Geologist (PG), and Technical Advisor. EPA attendees included the RPM, PO, deputy PO, an Office of Regional Counsel representative, Ecological Risk Assessor, Human Health Risk Assessor, Hydrogeologist, EPA Caribbean Environmental Protection Division (CEPD) representative, Pre-remedial Section Chief, and Pre-remedial Project Manager. Using EPA's videoconferencing equipment, CDM gave a slide presentation including a brief summary of the site history, site definition, ongoing activities, and a proposed technical approach. The group discussed the scope of work, additional potentially available documentation, and ongoing site activities.

5.1.3 Conduct Site Visit

The CDM SM, CDM RITM and EPA RPM conducted a site visit on October 6, 2008. The site visit consisted of visual observation of site conditions, current uses of surrounding and potentially involved properties, and evaluating potential logistical and safety issues.

5.1.4 Develop Draft Work Plan and Associated Cost Estimate

CDM has prepared this RI/FS work plan in accordance with the contract terms and conditions. CDM used existing site data and information, information from EPA guidance documents (as appropriate) and technical direction provided by the EPA RPM as the basis for preparing this work plan.

This work plan includes a comprehensive description of project tasks, the procedures to accomplish them, project documentation, and a project schedule. CDM uses internal QA/QC systems and procedures to insure that the work plan and other deliverables are of professional quality requiring only minor revisions (to the extent that the scope is defined and is not modified). Specifically, the work plan includes the following:

- Identification of RI project elements including planning and activity reporting documentation, field sampling, and analysis activities. A detailed work breakdown structure of the RI corresponds to the work breakdown structure provided in the EPA SOW (dated September 25, 2008) and discussions with EPA.
- CDM's technical approach for each task to be performed, including a detailed description of each task, the assumptions used any information to be produced during and at the conclusion of each task, and a description of the work products that will be submitted to EPA. Issues relating to management responsibilities, site access, site security, contingency procedures and storage and disposal of investigation derived wastes (IDW) are also addressed. Information is presented in a sequence consistent with the SOW.

- A schedule with dates for completion of each required activity, critical path milestones and submission of each deliverable required by the SOW and the anticipated review time for EPA.
- A list of key contractor personnel supporting the project (Section 7) and the subcontractor services required for the work assignment.

CDM will prepare and submit a draft work plan budget (as Volume II of the RI/FS work plan) that follows the work breakdown structure in the SOW. The draft work plan budget contains a detailed cost breakdown, by subtask, of the direct labor costs, subcontractor costs, other direct costs, projected base fee and award fee, and any other specific cost elements required for performance of each of the subtasks included in the SOW. Other direct costs are broken down into individual cost categories as required for this work assignment, based on the specific cost categories negotiated under CDM's contract. A detailed rationale describing the assumptions for estimating the professional level of effort (PLOE), professional and technical levels and skills mix, subcontract amounts, and other direct costs are provided for each subtask in the SOW.

5.1.5 Negotiate and Revise Draft Work Plan/Budget

CDM personnel will attend a work plan negotiation meeting at EPA's direction. EPA and CDM personnel will discuss and agree upon the final technical approach and costs required to accomplish the tasks detailed in the work plan. CDM will submit a negotiated work plan and budget incorporating the agreements made in the negotiation meeting. The negotiated work plan budget will include a summary of the negotiations. CDM will submit the negotiated work plan and budget in both hard copy and electronic formats.

5.1.6 Evaluate Existing Data and Documents

As part of the preparation of the work plan, CDM reviewed data collected during previous investigations at the site. Analytical data and other information from these background documents were incorporated, where applicable, into this planning document. Existing data are summarized in Sections 2 and 3.

5.1.7 Quality Assurance Project Plan

CDM will prepare a QAPP in accordance with the Uniform Federal Policy (UFP) for QAPPs and current EPA Region 2 guidance and procedures. The QAPP will be submitted as a separate deliverable. The QAPP describes the project objectives and organization, functional activities, and quality assurance (QA) and quality control (QC) protocols that will be used to achieve the required DQOs. The DQOs will, at a minimum, reflect the use of analytical methods to identify and address contamination consistent with the levels for remedial action objectives identified in the NCP.

The QAPP includes sampling objectives; sample locations and frequency; sampling equipment and procedures; personnel and equipment decontamination procedures; sample handling and analysis; and a breakdown of samples to be analyzed through the CLP and through other sources, as well as the justification for those decisions. The QAPP is written so that a field sampling team unfamiliar with the site would be able to gather the samples and field measurements. Technical Standard Operating Procedures (SOPs) are included in the QAPP. Each SOP or QA/QC protocol has been prepared in accordance with EPA Region 2 guidelines and the site-specific HSP.

The QAPP also addresses site management, including site control and site operations. The site control section describes how approval to enter the areas of investigation will be obtained, along with the site security control measures, and the field office/command post for the field investigation. The logistics of all field investigation activities are described. The site operations section includes a project organization chart and delineates the responsibilities of key field and office team members. A schedule will be included that shows the proposed scheduling of each major field activity.

Any significant changes to the QAPP will require an amendment; minor changes will be documented on a Field Change Request Form and submitted in a letter to the EPA RPM and EPA QA officer.

Other QA/QC Activities
QA activities to be performed during the implementation of this work plan may also include internal office and field or laboratory technical systems audits, field planning meetings, and QA reviews of all project plans, measurement reports, and subcontractor procurement packages. The QA requirements are discussed further in Section 7.2 of this work plan.

5.1.8 Health and Safety Plan

CDM will prepare a HSP in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 (1)(1) and (1)(2). The HSP includes the following site-specific information:

- Hazard assessment
- Training requirements
- Definition of exclusion, contaminant reduction, and other work zones
- Monitoring procedures for site operations
- Safety procedures
- Personal protective clothing and equipment requirements for various field operations
- Disposal and decontamination procedures
- Other sections required by EPA

The HSP also includes a contingency plan which addresses site specific conditions which may be encountered.

In addition to the preparation of the HSP, health and safety activities will be monitored throughout the field investigation. The HSP will specify air monitoring procedures in the exclusion zone established around the drilling rig or sampling locations. A qualified Health and Safety (H&S) coordinator, or designated representative will attend the initial field planning meeting and may perform a site visit to ensure that all H&S requirements are being adhered to. A member of the field team will be designated to serve as the onsite H&S coordinator throughout the field program. This person will report directly to both the FTL and the H&S coordinator. The HSP will be subject to revision, as necessary, based on new information that is discovered during the field investigation.

5.1.9 Non-RAS Analyses

Non-RAS analyses are described in Section 5.4.3.

5.1.10 Meetings

CDM will participate in various meetings with EPA during the course of the work assignment. As directed by EPA's SOW, CDM has assumed eight meetings, with two people in attendance, for four hours per meeting. Six of these meetings will be held in Puerto Rico and two will be held in New York. CDM will prepare minutes which list the attendees and summarize the discussions in each meeting.

5.1.11 Subcontract Procurement

This subtask will include the procurement of all subcontractors required to complete the field investigation activities. Procurement activities include: preparing the technical SOW; preparing Information for Bidders (IFB) or Request for Proposal (RFP) packages; conducting pre-bid site visits (when necessary); responding to technical and administrative questions from prospective bidders; performing technical and administrative evaluations of bid documents; performing the necessary background, reference, insurance, and financial checks; preparing consent packages for approval by the EPA CO (when necessary); and awarding the subcontract.

To support the proposed field activities, the following subcontractors will be procured:

- A licensed driller to drill groundwater screening borings, soil borings, install and develop monitoring wells, piezometers and staff gauges
- Borehole geophysics and packer testing subcontractor
- FLUTe System manufacturer for borehole liners, hydraulic profiling and multiport groundwater monitoring systems
- An analytical laboratory subcontractor to perform non-RAS analyses described in Section 5.4.3 and on Table 5-1
- A licensed surveyor to survey the location and elevation of all monitoring wells, piezometers, and staff gauges that will be installed during the RI/FS. Because the site area is large and the location of the source (s) is unknown, a detailed topographic map will not be produced for the site. The locations of all sampling points and monitoring wells will be displayed on ortho-rectified aerial photographs
- A cultural resources subcontractor to conduct a Phase IA survey of the local area
- A subcontractor to haul and dispose of IDW, to remove and properly disposal of roll-off containers and storage tanks containing RI generated waste liquids and solids

All subcontractor procurement packages will be subject to CDM's technical and QA reviews.

5.1.12 Subcontract Management

The SM and CDM's subcontracts managers will perform the necessary oversight of the subcontractors (identified under Section 5.1.11) needed to perform the RI/FS. CDM will institute procedures to monitor progress, and maintain systems and records to ensure that the work proceeds according to the subcontract and RAC contract requirements. CDM will review and approve subcontractor invoices and issue any necessary subcontract modifications.

5.1.13 Pathway Analysis Report

In accordance with OSWER Directive 9285.7-47 entitled *Risk Assessment Guidelines for Superfund - Part D* (2001a), CDM will provide EPA with standard tables, worksheets, and supporting information for the risk assessment as an interim deliverable prior to preparation of the baseline human health risk assessment report.

CDM will prepare a Pathways Analysis Report (PAR) that consists of RAGS Part D Standard Tables 1 through 6 series and supporting text. The PAR will summarize the key assumptions regarding potential receptors, exposure pathways, exposure parameters, and chemical toxicity values that will be used to estimate risk in the baseline HHRA. Because RAGS Part D Tables 2 and 3 series summarize site data, these tables for the PAR will be prepared after analytical data collected during the RI site investigation are available. Preparation of the PAR initiates the risk assessment process, whose components are described in greater detail in Section 5.7.1.

CDM will coordinate with EPA to define potential exposure pathways and human receptors. To accomplish this, CDM will review all available information obtained from EPA pertaining to the San German site, including data generated during previous investigations. CDM will integrate this information with site data generated during the field investigations. Background information on the site will be summarized, and samples collected and the data analyzed for various media will be discussed. The treatment of data sets (e.g., duplicates, splits, blanks [trip, field, and laboratory], multiple rounds, and qualified and rejected data) will be discussed, and chemical-specific exposure point concentrations (EPCs) for each medium and each exposure scenario will be selected. Based on current knowledge, potential receptors are identified in Section 5.7.1.

Exposure parameters to be used for the calculation of daily intakes will be presented. Carcinogenic and non-carcinogenic toxicity values for COPCs and the sources of these values will be presented in the PAR. As noted above, the selection of chemicals COPCs, exposure pathways and receptors, EPCs, exposure parameters, and toxicity values will be summarized in tabular form in accordance with the standard tables of RAGS Part D.

Upon EPA's approval of the PAR, CDM will characterize risks associated with the site and initiate preparation of the draft baseline HHRA report as described in Section 5.7.1.

5.2 Task 2 Community Involvement

CDM will provide technical support to EPA during the performance of the following community involvement activities throughout the RI/FS in accordance with the *Community Relations in Superfund-A Handbook* (EPA 1992b).

5.2.1 Community Interviews

CDM will perform the following activities:

- Preparation for Community Interviews - CDM will review background documents and provide technical and bilingual support to EPA in conducting community interviews with government officials (federal, Commonwealth, town, or city), environmental groups, local broadcast and print media, either in person or by telephone.
- Questions for Community Interviews - CDM will prepare draft interview questions in both Spanish and English for EPA's review. Final questions will reflect EPA's comments on the draft questions.

5.2.2 Community Relations Plan

CDM will prepare a draft Community Relations Plan (CRP) that presents an overview of community concerns. The CRP will include:

- Site background information including location, description, and history
- Community overview including a community profile, concerns, and involvement
- Community involvement objectives and planned activities, with a schedule for performance of activities
- Mailing list of contacts and interested parties
- Names and addresses of information repositories and public meeting facility locations
- List of acronyms
- Glossary

CDM will submit a Final CRP which reflects EPA's comments.

5.2.3 Public Meeting Support

CDM will perform the following activities to support six public meetings and availability sessions.

- Make reservations for a meeting space, in accordance with EPA's direction
- Attend three public meetings and three availability sessions, and prepare draft and final meeting summaries
- Reserve a court reporter for each of the three public meetings
- Provide full-page and "four on one" page copy of meeting transcripts, five additional copies of the transcripts, and an electronic copy of each transcript in Microsoft Word 2007 or latest version.

CDM will develop draft visual aids (i.e., transparencies, slides, and handouts) as instructed by EPA. CDM will develop final visual aids incorporating all EPA comments. For budgeting purposes, CDM will assume 35 slides and 75 handouts for each public meeting. The handouts will be prepared in English and Spanish.

5.2.4 Fact Sheet Preparation

CDM will prepare draft information letters/updates/fact sheets. CDM will research, write, edit, design, lay out, and photocopy the fact sheets. The fact sheets will be written in both English and Spanish. CDM will attach mailing labels to the fact sheets before delivering them to EPA from where they will be mailed. For budgeting purposes, CDM will assume three fact sheets (one for each public meeting), three to five pages in length, with four illustrations per fact sheet. CDM assumes 150 copies of each fact sheet will be provided to EPA. Final fact sheets will reflect EPA's comments.

5.2.5 Proposed Plan Support

CDM will provide administrative and technical support for the preparation of the draft and final Proposed Plan describing the preferred alternative and the alternatives evaluated in the FS. The Proposed Plan will be prepared in accordance with the NCP and the most recent version of *EPA Community Relations in Superfund - A Handbook* (EPA 1992b). The Proposed Plan will describe opportunities for public involvement in the ROD. The Proposed Plan will be written in English and Spanish.

A draft and final Proposed Plan will be prepared. The final will reflect EPA comments.

5.2.6 Public Notices

CDM will prepare newspaper announcements/public notices for each public meeting, for inclusion in the most widely read local newspapers, with each ad placed in two large, area-wide newspapers and one small town local newspaper. A total of three public announcements/notices will be prepared in both English and Spanish for three public meetings and/or availability sessions.

5.2.7 Information Repositories

In accordance with the SOW, this subtask is currently not applicable to this work assignment.

5.2.8 Site Mailing List

CDM will update the community relations mailing list two times for the San German site. The mailing list will be developed under Subtask 5.2.2 – Community Relations Plan, and is estimated to consist of 130 names. CDM will provide EPA with a copy of the mailing list on diskette and mailing labels for each mailing. EPA will do the actual mailing of any information to the community.

5.2.9 Responsiveness Summary Support

CDM will provide administrative and technical support for the San German site Responsiveness Summary. The draft document will be prepared by compiling and summarizing the public comments received during the public comment period on the Proposed Plan. CDM will prepare technical responses for selected public comments, for EPA review and use in preparing formal responses. CDM assumes 150 separate comments, including duplicates, will be received and that 130 technical responses will be necessary.

5.3. Task 3 Field Investigation/Data Acquisition

This task includes all activities related to implementing RI/FS field investigations at the site. The main objectives of the field program include:

- Defining the extent of chlorinated VOC contamination in the groundwater
- Defining the nature and extent of contamination in the source areas
- Define the impact the groundwater contamination may have on surface water
- Obtain data to develop remedial alternatives
- Obtain data to perform the risk assessments (HHRA and SLERA)

Based on these objectives the task descriptions have been developed after review and evaluation of the site background data currently available and the SOW provided by EPA. The major elements of the field investigation include:

- Site reconnaissance
- Mobilization/ demobilization
- Existing well investigation
- PSA investigation
- Groundwater screening investigation
- Multi-port well drilling and installation of multi-port systems
- Borehole geophysics
- Packer sampling
- Borehole hydraulic conductivity testing
- Overburden well installation
- Slug testing
- Aquifer testing
- Groundwater/surface water interaction evaluation
- Long term water level monitoring
- Groundwater, surface water and sediment sampling
- IDW sampling and disposal

The technical approach to the field investigation was outlined in Section 4.2; details including field activities, field investigation staging, media to be investigated, and anticipated laboratory analyses are described below. Proposed field sampling locations are presented on Figures 5-1 to 5-6 and the field investigations and sampling activities associated with each portion of the field program are summarized on Tables 5-1 and 5-2, respectively.

Use of a dynamic approach requires some flexibility in development of the work plan and execution of the field investigation, largely because of uncertainties derived from a process that uses expedited turnaround times and preliminary data to focus and refine subsequent investigation activities. Therefore, it was necessary to make some assumptions about the quantities for planned activities. For example, the number of ports required for a given multiport monitoring well depends on a number of factors including the final depth of the well, location of water bearing zones, and vertical distribution of contaminants obtained from fracture zone sampling. Assumptions made for each stage of work are clearly defined in this work plan. The rationale and decisions required to determine the actual quantities are also defined for activities that depend on evaluation of data from previous activities.

This work plan divides the field investigation activities into two major portions, hereinafter referred to as the Southern Investigation and the Northern Investigation. The task structure and order of discussion of tasks/subtasks in Section 5 of this work plan is defined by the SOW; it does not reflect the proposed sequence of field activities.

The groundwater plume as defined includes the detections of VOCs slightly greater than MCLs in the three public supply wells. VOC migration via groundwater to these wells from release sites or PSAs identified in the community has not been confirmed. Site contaminants (VOCs that have been detected in the public supply wells) have been detected in soil and groundwater at HP/Compaq, at more than one parcel within RIP, and at the Acorn property.

The initial focus of the RI, the Southern Investigation, is identification and confirmation of contaminant sources, with subsequent definition of the nature and extent of contamination impacting the supply wells south of Rio Guanajibo. The investigation will begin near the confirmed location of the greatest concentrations of contaminants detected to date – the Wallace parcels – and conclude with groundwater sampling on the south side of Rio Guanajibo. The focus of the Northern Investigation is to fully define the nature and extent of contamination in site media, including sufficiently establishing contaminant boundaries to develop remedial alternatives and prepare a ROD.

Remedial actions have been undertaken at HP since 1994 and are still ongoing. Additionally, HP has reportedly controlled contaminant migration from the property via the operation and maintenance of a groundwater extraction and treatment system, and its physical situation down river from the well field makes it less likely to impact the supply wells. However, HP cannot be discounted as a potential source of the groundwater contamination at the well field. Confirming the migration of contamination from HP to the well field will be undertaken during the Northern Investigation, taking full advantage of the hydrogeologic and contaminant information derived during the Southern Investigation.

Investigation Sequencing

Because of the limitations of the existing data and the lack of a defined source of contamination at the San German site, the sequencing and timing of initial field activities takes on greater importance in supporting to the focus and refinement of subsequent data collection activities. For example, evaluating information from the existing well investigation will refine subsequent groundwater investigation activities. The sequencing of this field program is designed to efficiently fill in gaps in the existing information and cost-effectively identify locations of contaminant release impacting the wellfield. It also provides flexibility to focus the investigation on potential source areas identified in the early stages of the investigation. This is particularly applicable for the San German site where existing hydrogeologic information is limited and the source of contamination has not been identified.

The proposed sequence for the major field activities is provided below:

Southern Investigation

1. PSA Inspections
   Objective: evaluate current conditions and determine if further investigation is warranted or refine planned investigations

Wallace	GE	Cordis/OMJ
Baytex	Acorn	Baxter
CCL	HP	Abandoned Gulf
Garaje Rodriguez		

2. Reconnaissance Activities
   Objective: to identify sampling locations and plan access

3. Existing Well Investigation and Sampling
   Objective: to provide current contamination and flow characteristics
   - 6 local supply wells
   - 7 additional local wells

4. PSA Investigations
   Objective: to document the presence of site-related VOCs in soil and groundwater, identify source areas, and support further groundwater evaluations
   - Wallace
   - Any additional PSAs identified within RIP or south of Rio Gunanajibo
   - Acorn
   - Any additional PSAs identified north of Rio Gunanajibo

5. Southern Groundwater Screening Investigation
   Objective: to delineate site VOCs migrating to the wellfield and/or Rio Guanajibo, obtain preliminary lithologic/stratigraphic data, and support well location selections
   - Wallace – adjacent/downgradient transect along Calle A/Calle B
   - Transects delineating downgradient migration
   - Acorn – adjacent to property border
   - Other PSAs identified within RIP or south of Rio Gunanajibo

6. Groundwater Screening Technical Meeting
   Objective: identify permanent monitoring well locations

7. Southern Well Installations
   Objective: install permanent points at 12 locations to delineate and monitor site VOC migration

Borehole drilling/coring	Multiport monitoring well installations

Borehole logging — Overburden well installations
Fracture zone sampling

8. Groundwater Sampling Round 1 (12 multiport and 12 overburden wells)
   Objective: initiate confirmation of VOC plume

Northern Investigation

9. Northern Groundwater Screening Investigation
   Objective: to delineate site VOCs migrating from HP to the wellfield and/or Rio Guanajibo, obtain preliminary lithologic/stratigraphic data, and support well location selections
   Transect between HP and the PRASA wells
10. Groundwater Screening Technical Meeting
    Objective: identify permanent monitoring well locations
11. Northern Well Installations (6 multiport and 6 overburden wells)
    Objective: install permanent points at 6 locations to delineate and monitor site VOC migration
    Borehole drilling/coring — Multiport monitoring well installations
    Borehole logging — Overburden well installations
    Fracture zone sampling
12. Hydrogeologic Investigation
    Objective: define the hydraulic properties of geologic formations and the relationship between groundwater and surface water bodies
13. Surface Water/Sediment Investigation
    Objective: Determine if contaminants are present within drainage structures and if this contamination impacts media at identified points of discharge
    Rio Guanajibo — Unnamed Tributary — PSAs
14. Groundwater Sampling Round 2 (18 multiport and 18 overburden wells)
    Objective: Initiate full characterization of groundwater contamination
15. Groundwater Sampling Round 3 (18 multiport and 18 overburden wells)
    Objective: Confirm characterization of groundwater contamination and monitor plume dynamics
16. Ecological Field Characterization
    Objective: characterize ecological conditions along potential contaminant migration pathways
17. Indoor Air Evaluation
    Objective: determine impacts of VOCs detected near occupied structures

The dynamic approach described in this work plan also requires significant communication and coordination with the EPA RPM and EPA technical specialists, particularly at decision points during the course of the program. The CDM SM will maintain regular communication with the EPA RPM throughout the field investigation. Technical memoranda will be prepared by CDM and technical meetings will be held to facilitate decision making required during the RI.

5.3.1 Site Reconnaissance

To complete this RI/FS work plan, CDM conducted an initial site visit to become familiar with local and site-specific conditions. CDM's SM and RITM conducted a reconnaissance of the site and surrounding area to evaluate logistical issues relevant to the groundwater screening program, monitoring well installation, and surface water and sediment sampling programs.
Additional site reconnaissance activities will be performed to support mobilization and to prepare for drilling and sampling activities. The following reconnaissance activities are required to support the field activities:

- PSA inspections
- Groundwater screening/monitoring well installation reconnaissance
- Surface water study reconnaissance
- Risk assessment reconnaissance
- Cultural resources survey oversight
- Topographical survey oversight

CDM will take representative photographs to document the reconnaissance activities and significant events or observations during the RI/FS field program. A caption and the date and time the photograph was taken will be included on each photograph. These photographs will be maintained in electronic format and submitted to EPA as part of the RI report.

As part of the activities listed above, CDM will review the aerial photography report provided by EPA. These photographs will be analyzed by CDM and the result of the analysis will be used to modify sampling locations if necessary. A well survey of potential residential and commercial wells will be conducted during site reconnaissance activities. The survey will include a search of available databases and records and consultation with PRASA and municipal offices.

5.3.1.1 PSA Inspections

CDM will conduct walkovers and informational surveys of PSAs previously identified by EPA and at several other PSAs identified during discussions with EPA. Although the SDI concluded no further response actions for several of the facilities, the data and historical information collected is very limited. CDM will also attempt to identify and survey additional PSAs such as gas stations and dry cleaners in the area. Detailed summaries of previous data collected at the PSAs are included in Section 2 and Section 3.

The walkovers and interviews will collect additional information on these facilities and may help identify potential sources of VOC groundwater contamination. The reconnaissance will include visual inspection of the interiors of the buildings and the exterior facility property for evidence of past and present disposal areas or discharge points (floor drains, discharge pipes, waste handling practices, etc.), discussions with current owners/operators, and search of PREQB records for additional historical information regarding operations and waste disposal. Walkover surveys will be conducted at the following areas:

- Retiro Industrial Park: Wallace (including Former Wallace International and Former International Silver parcels), Baytex, CC Label, Garaje Rodriguez, and GE
- North of the river: Cordis/OMJ, Baxter, Abandoned Gulf, and HP
- Others: Acorn

CDM will also locate and map (with a field global positioning system (GPS) unit) existing wells and drainage features including catch basins, discharge pipes, seeps, drainage channels, ponded areas, and swales. This will allow CDM to identify additional sample locations for the existing well investigation (Section 5.3.3.1) and the surface water/sediment investigation (Section 5.3.5.2).

CDM assumes EPA will be responsible for obtaining access to the properties listed above and any additional PSAs identified. These activities will occur during the Southern field investigation.

5.3.1.2 Groundwater Screening/Monitoring Well Installation Reconnaissance

Prior to beginning the field program, CDM will identify locations for groundwater screening borings and monitoring well installations on the PSA properties and downgradient. Prior to beginning the field program the field team will visit proposed locations to identify and mark exact drilling locations and assess potential logistical issues and physical access constraints for the drill rig. Potential problem locations will be documented and photographed and locations may be adjusted to facilitate access. It is anticipated that reconnaissance activities will take place at two points during the field investigation: before the Southern field investigation and before the Northern field investigation.

Many of the locations are located on private property; it is anticipated that close coordination will be required with property owners and local authorities regarding access and safety issues. EPA (with CDM support) will be responsible for obtaining access to the properties.

Prior to performing any drilling, CDM's drilling subcontractor will request a utility markout to identify the locations of underground utilities. CDM will verify that the utility markout was performed before drilling activities begin. Potential problem locations will be documented and photographed and locations may be adjusted to facilitate access.

5.3.1.3 Surface Water Study Reconnaissance

Prior to conducting the surface water and sediment sampling (Section 5.3.5.2) and surface water/groundwater interaction evaluation (Section 5.3.3.3.2), the field team will visit proposed locations on the Rio Guanajibo and its associated tributaries to assess potential logistical issues, safety issues, and physical access constraints. Potential problem locations will be documented and photographed and sampling locations may be adjusted based on the reconnaissance. This activity will occur during the Northern field investigation.

5.3.1.4 Risk Assessment Reconnaissance

The senior human health risk assessor and ecological risk assessor will visit the site to gain a better understanding of the physical site characteristics, property boundaries, property uses, and potential receptors. This activity will occur during the Northern field investigation.

5.3.1.5 Cultural Resources Survey Oversight

The CDM cultural resources survey subcontractor will conduct a cultural resources survey covering the study area. The Stage 1A Cultural Resources Survey will be prepared in order to determine the presence or absence of cultural resources which may be impacted by the implementation of any remedial actions. The Stage IA survey is the initial level of survey and requires comprehensive documentary research and an initial walk-over reconnaissance and surface inspection. CDM will oversee the on-site activities of the cultural resources subcontractor. This activity will occur during the Northern field investigation.

5.3.1.6 Topographic Survey Oversight

A topographic map of the site will not be created since the site consists of a large area and a source area has not been identified. An ortho-rectified aerial photograph will be used as the base map for well and sample locations and figure development. Three surveying events are anticipated: The first survey event will occur as part of the existing well investigation (Section 5.3.3.1), the second will occur after the Southern field investigation, and the third will occur after the Northern field investigation. It is anticipated that the locations and elevations of the groundwater screening points, PSA soil sample locations, and initial multiport monitoring wells will be surveyed during the Southern field investigation. At the conclusion of the Northern field investigation the locations and elevations of surface water and sediment samples, groundwater/surface water interaction points, and stream staff gauge and additional multiport monitoring wells will be surveyed.

Three elevations will be determined at each existing well and multiport monitoring well: the ground surface, the top of the inner casing, and the top of the outer casing.

5.3.2 Mobilization and Demobilization

This subtask will consist of property access assistance; field personnel orientation; field office and equipment mobilization and demobilization; and field supply ordering, staging, and transport to the site.

It is anticipated that one major mobilization will be required at the beginning of the Southern field investigation and that a major demobilization will be required at the end of the Northern field investigation. Minor demobilization and mobilization activities will be required at the completion of the Southern field investigation and at the beginning of the Northern field investigation, respectively.

5.3.2.1 Site Access Support

Access to public areas (roads, parks, etc.) and private property will be needed to execute the field investigation. EPA will be responsible for obtaining site access.

CDM will assist EPA with site access. Significant access support is anticipated for the following field sampling activities:

- PSA reconnaissance
- Existing well investigation
- PSA and site-wide groundwater screening investigation
- Well installation program
- Groundwater/surface water interaction evaluation

CDM will provide a list of property owners (public and private) to be accessed during field activities. The list will include the mailing address and telephone number of the property owners. Once EPA has established that access has been granted, sampling activities can begin. CDM will contact and coordinate with property owners and local officials (for work in public areas) to schedule sampling activities.

5.3.2.2 Field Planning Meetings

Prior to RI field activities, each field team member will review all project plans and participate in a field planning meeting conducted by the CDM SM and RITM to become familiar with the history of the site, H&S requirements, field procedures, and related QC requirements. All new field personnel will receive a comparable briefing if they do not attend the initial field planning meeting and/or the tailgate kick-off meeting. Supplemental meetings may be conducted as required by any changes in site conditions or to review field operation procedures.

5.3.2.3 Field Equipment and Supplies

Equipment and field supply mobilization will entail ordering, renting, and purchasing all equipment needed for each part of the RI field investigation. This will also include staging and transferring all equipment and supplies to and from the site. Measurement and Test Equipment forms will be completed for rental or purchase of equipment (instruments) that will be utilized to collect field measurements. The field equipment will be inspected for acceptability, and instruments calibrated as required prior to use. This task also involves the construction of a decontamination area for sampling equipment and personnel. A separate decontamination pad will be constructed by the drilling subcontractor for drilling equipment.

Field Trailer, Utilities, and Services

EPA will assist with finding a suitable location for the command post area. Arrangements for the lease of a field trailer and associated utilities, a secure storage area for IDW, trash container, and portable sanitary facilities will be made. The command post area must be large enough to accommodate a 40-foot office trailer, at least one 20-cubic-yard roll-off containers, four 6,500-gallon water tank trucks, portable sanitary facilities, a decontamination area, drilling equipment and supplies, drill rigs and subcontractor support vehicles, and CDM vehicles.

H&S work zones including personnel decontamination areas will be established. Local authorities such as the police and fire departments will be notified prior to the start of field activities. Equipment will be demobilized at the completion of each field event, as necessary. Demobilized equipment will include sampling equipment, drilling subcontractor equipment, H&S equipment, and decontamination equipment.

5.3.2.4 Site Preparation and Restoration

Site Preparation

CDM will conduct ground truthing for overhead utilities and surface features around intrusive subsurface sampling locations. The drilling subcontractor will be responsible for contacting an appropriate utility location service to locate and mark out underground utilities.

CDM plans to use existing roadway rights-of-way, open space, and clearings to the maximum extent possible to access sampling locations. However, it may be necessary to clear some areas of vegetation and trees in order to access sampling locations. The drilling subcontractor will be responsible for clearing vegetation. CDM will direct and oversee any necessary clearing activities conducted by the drilling subcontractor.

Site Restoration

Some field activities are expected to occur on private and public properties. In the event that properties are impacted by field activities, the property will be restored, as near as practicable, to the conditions existing immediately prior to such activities. CDM will maintain photographic documentation of site conditions prior to commencement of and after completion of RI field activities.

At the completion of the field activities, decontamination pad materials will be decontaminated and removed from the command post area, unless otherwise instructed by EPA. The decontamination and command post area will be restored, as near as practicable, to its original condition.

Site restoration will be performed by the drilling subcontractor under the direction of CDM personnel who will perform field oversight and H&S monitoring.

5.3.3 Hydrogeological Assessment

This section defines the objectives of the hydrogeological assessment and describes the hydrogeologic investigation activities that will be performed to identify PSAs and define the nature and extent of groundwater contamination at the San German site. CDM reviewed existing information provided by EPA, including ESI Reports for three PSAs (Wallace, Abandoned Gulf Station, and Acorn) and groundwater sampling results for the PRASA supply wells. CDM also reviewed historical sampling data from the HP PSAs, and published geologic and hydrogeologic reports for the area. These data are summarized in Sections 2 and 3.

Review of this data indicates significant gaps in the understanding of the nature and extent of groundwater contamination and the hydrogeologic framework at the site. Section 4.2 - Work Plan Approach - describes the technical approach to the hydrogeological investigation; details including field activities, field investigation staging, media to be investigated, and anticipated laboratory analyses are described below.

This work plan divides the hydrogeologic investigation activities into two major portions referred to as the Southern field investigation and the Northern field investigation. The work plan structure has been modified to accommodate the sequential nature of the hydrogeological investigation. Thus, hydrogeological investigation activities needed to define the nature and extent of groundwater contamination are described in two separate sections; Southern field investigation and Northern field investigation.

5.3.3.1 Southern Hydrogeologic Field Investigation

The primary objectives of the Southern hydrogeological field investigations are to:

- Identify if residual contamination remains at any of the PSAs
- Define the boundaries of the contamination within the overburden and bedrock aquifer south of Rio Guanajibo
- Provide information on the hydraulic characteristics of the aquifers
- Provide information on the relationship between Rio Guanajibo and groundwater in the vicinity of the PRASA well field
- Support development of remedial alternatives for groundwater in the FS.

To support the primary objectives, the following hydrogeologic investigation activities will be performed at the site:

- Existing well investigation
- Well installation program
- Hydrogeologic investigation program

5.3.3.1.1 Existing Well Investigation

CDM will perform an assessment of all existing monitoring wells, evaluating their suitability, both conceptually and technically, for sampling to characterize site contaminants accurately and thoroughly for the RI. This assessment will include:

- Inactive public supply wells (3)
- El Real public supply well
- Santa Marta well
- Wallace well
- Elderly facility well

CDM will review monitoring well construction records to determine which wells would be suitable for sampling. Following a review of construction details, CDM will select the monitoring wells to be further assessed. The assessment will include the removal of pumps located within the wells and the use of a downhole video camera to view the condition of the well. If a well appears suitable, the well will be sampled as part of this investigation. Prior to sampling, water levels will be collected at each of the wells. If needed, CDM will have the horizontal and vertical coordinates of each well surveyed by a licensed surveyor to allow for an assessment of the groundwater flow direction to be made prior to beginning additional field investigations.

Groundwater samples will be collected by lowering a suitable pump (Grundfos or equivalent) into the well screen. If a well was completed as an open rock hole, up to three samples will be collected from fracture zones observed from the downhole video. If the pump cannot be retrieved, one groundwater sample will be collected from the well. It is assumed that three wells will be open rock hole and four wells will be sampled from existing pumps. Wells will be purged and sampled following the site-specific low-flow, minimal drawdown sampling procedure which follows the EPA SOP, "Ground Water Sampling Procedure, Low Stress (Low Flow) Purging and Sampling", dated March 16, 1998 (final version) and will be detailed in the QAPP.

Well samples will be analyzed for TCL trace VOCs through the EPA CLP, DESA or a subcontract laboratory. Dissolved oxygen, oxidation-reduction potential (Eh), turbidity, pH, temperature, and conductivity measurements will be made in the field. For cost estimation purposes, it is assumed that 13 groundwater samples will be collected as part of the existing well investigation.

5.3.3.1.2 Well Installation Program

Following completion of the groundwater screening program (Section 5.3.4.2) and after review of the data with EPA, CDM will install approximately 10 overburden monitoring wells and 10 Flute system multi-port monitoring wells south of Rio Guanajibo. The wells will be installed in order to:

- Verify data identified during the groundwater screening program
- Refine the boundaries of VOC plume in the overburden and bedrock aquifer south of Rio Guanajibo
- Collect lithologic and stratigraphic data to refine the CSM
- Provide analytical data to support development of the FS

In order to complete this part of the field program, field tasks will be completed sequentially with each step being completed and data evaluated concurrently, to allow the next portion of the field program to be completed. This will require close communication between the EPA RPM and CDM team. The following activities will be performed as part of this program:

- Borehole drilling and coring
- Borehole geophysics
- Low flow fracture zone sampling
- Borehole hydraulic conductivity testing
- Multi-port well installation
- Overburden well installation

Figure 5-1 presents the proposed monitoring well locations south of Rio Guanajibo. Following review of the data generated during the existing well investigation (Section 5.3.3.1.1) and the groundwater screening investigation (Section 5.3.4.2) locations and depths for the multi-port monitoring wells will be finalized.

One pair of overburden/bedrock monitoring wells will be located within the former well field, four will be located on or adjacent to the Wallace/RIP properties, one will be located upgradient of the RIP properties as a background well, and four will be located within the area of the suspected VOC plume between the industrial facilities and the well field.

Borehole Drilling and Coring

A combination of air rotary and diamond bit coring drilling methods will be used to advance the monitoring well boreholes to depth. Little is known about the structure of the bedrock, so it is not possible at this time to establish a firm maximum depth for the boreholes based on the depth of contamination, relative permeability of aquifer units, or aquifer structure. Analytical data from discrete-depth sampling of the existing wells is expected to provide initial data to support evaluation of the depth of contamination within the aquifer. At this point in the planning process, boreholes are proposed to be drilled to approximately 200 ft bgs.

Tables 5-1 through 5-3 summarize borehole locations, proposed testing at each borehole, and the rationale for the location of each well. The following sections describe drilling methods for the boreholes. Final procedures will be detailed in the QAPP.

Borehole Drilling With Rock Coring

Three of the 10 bedrock boreholes south of Rio Guanajibo (Figure 5-1) will be advanced using rock coring techniques in the bedrock. Rock coring will be performed to provide information to verify downhole geophysical logging data and to investigate potential DNAPL. The unconsolidated soil portion of the borehole will be advanced from the ground surface to the bedrock using 8-inch diameter air rotary drilling; a 6-inch diameter carbon steel casing will be tightly sealed into competent bedrock using a cement/bentonite grout slurry. Upon installation of the outer steel casing, an NQ (2.78 inch diameter) rock coring bit will be used to advance a nominal 3-inch diameter borehole to depth. The on-site geologist will log the rock core, place the core in a core box, and store the core box for future reference. Rock cores, overburden cuttings, and rock cuttings will be screened for VOCs. The rock cores will either be transferred to an archive (e.g., USGS archive, Puerto Rico government archive, EPA archive) or disposed of at the completion of the work assignment.

Upon completion of the rock coring, the corehole will be reamed through the bedrock using the air rotary with direct circulation drilling method with a nominal 6-inch (5.78 inch) diameter hammer bit to create a nominal 6-inch borehole.

After completion of subsequent downhole geophysical logging and packer sampling, a Flute system liner will be installed in the borehole to prevent inter-borehole flow and cross contamination among different fracture zones within the well.

Borehole Drilling With Air Rotary

The remaining boreholes will be advanced using air rotary drilling methods in the bedrock. Air rotary drilling will be used to advance the borehole through the unconsolidated material to the bedrock using an 8-inch drill bit; a 6-inch diameter carbon steel casing will be tightly sealed into competent bedrock using a cement/bentonite grout slurry. Upon installation of the outer steel casing, the borehole will be advanced through the bedrock using the air rotary with direct circulation drilling method with a nominal 6-inch (5.78 inch) diameter hammer bit to create a nominal 6-inch borehole.

The on-site geologist will monitor and record the materials brought to the surface by air rotary drilling methods. Overburden cuttings, and rock cuttings will be screened for VOCs.

Borehole Development

Boreholes will be developed to remove fines and drilling fragments from the borehole and to clear borehole fractures. Due to the nature of the drilling techniques (air rotary and rock coring), boreholes are expected to require limited development. However, development will be required to ensure that the boreholes are clean and properly prepared for subsequent packer sampling, downhole logging, and multiport monitoring wells. Upon reaching terminal depth, the boreholes will be developed by recirculating air down the borehole multiple times to ensure that fines are removed and groundwater is not turbid. Well development procedures will be detailed in the site-specific QAPP.

Drilling Waste Management

Drill cuttings and water from drilling operations will be containerized at the drilling location and transported by the drilling subcontractor to a central waste storage area. Liquid wastes will be transferred to 7,000 gallon water tank trucks and drill cuttings will be transferred to 20 cubic yard roll-off containers for subsequent sampling, characterization, and disposal by CDM's IDW subcontractor.

Borehole Geophysics

Following completion of the bedrock boreholes geophysical logging instruments will be used to provide data to define the lithology, fracture zones, vertical flow and water bearing zones of each borehole. The following suite of borehole logs will be run for the purposes indicated:

- Fluid resistivity and temperature (one tool): Data from these logs indicate borehole fluid entry/exit points.
- Natural gamma: Correlate rock cores to define stratigraphy.
- Optical and acoustic televiewer: data shows borehole wall lithology, strike and dip of fractures and bedding planes.
- Mechanical caliper: data shows borehole wall condition, useful for deciding where to place multi-port well ports.
- Vertical flow-Static (heat pulse) and pumped (heat pulse) (one tool , 2 runs): data shows fluid entry and exit points and flow rates.

Downhole geophysical logging will be performed by a subcontractor to CDM with experience performing downhole logging. The subcontractor will supply the necessary equipment and personnel to perform the logging. The CDM Hydrogeologist will direct and oversee the subcontractor. The geophysical data will be collected in electronic format and will be analyzed and evaluated by CDM to determine subsequent packer sample locations and multiport monitoring zones.

Borehole geophysical logging methods will be detailed in the site-specific QAPP.

Low Flow Fracture Zone Sampling

CDM recommends low flow groundwater sampling at targeted fracture zones instead of the more costly packer sampling in an attempt to collect samples more efficiently and at a lower cost while still meeting the DQOs for screening level samples.

The objective of the low flow fracture zone sampling is to collect discrete depth, screening-level groundwater data to establish the vertical boundaries of contamination and to provide contaminant distribution data to aid in the selection of multiport monitoring well ports. It is assumed that six fracture zone samples will be collected from each of the 10 boreholes for a total of 60 samples. Fracture zone samples will be collected at depths determined from the geophysical logging data. Specific details on sampling procedures will be included in the QAPP.

To facilitate the fracture zone sampling, the downhole geophysical logging data will be reviewed on an ongoing basis by the CDM Hydrogeologist. The CDM SM and Hydrogeologist will provide recommendations for fracture zone sampling intervals and discuss them with the EPA Hydrogeologist and RPM prior to collecting any samples.

A low flow sampling pump will be used to pump water out of the fracture zone interval at a constant low flow rate. Fracture zone sampling will begin at the deepest fracture zone interval and proceed upward. The pump and tubing will not be removed between successive samples within the same borehole. The pump will be decontaminated between boreholes and new tubing will be used at each borehole. Water quality parameters such as pH, temperature, conductivity, and dissolved oxygen will be monitored for stabilization prior to sample collection.

Once stabilization has occurred, the groundwater sample will be collected for analysis of TCL trace VOCs with a 24-hour turnaround basis. Sampling procedures will be detailed in the site-specific QAPP.

Borehole Hydraulic Conductivity Profiling

As part of the installation of the FLUTe blank liner system, hydraulic conductivity profiling will be performed. As the liner is lowered into the borehole the volume of water being displaced into the fractures and the rate at which it is displaced can be measured to provide hydraulic conductivity estimates of the fractured rock. This testing will be done by the FLUTe liner subcontractor. Hydraulic conductivity values are depth specific to provide very good estimates of fracture locations and productivity. Specific details of the profiling method and field personnel necessary to perform the investigation will be included in the QAPP.

Multiport Monitoring Well Installation

CDM has performed a technical evaluation of three multiport vendors for the Cidra Superfund site in Puerto Rico (CDM 2008). Like the San German site, the Cidra site is also composed of VOC contaminated public supply wells with no known source(s). The bedrock aquifer at both sites is composed of fractured volcanic rocks. The borehole dimensions are also the same as those proposed for San German. Installation of the FLUTe multiport systems at the Cidra site was efficient since it arrives pre-manufactured on a roll and is lowered to the pre-determined depth. Groundwater sampling was also efficient since ports can be purged and sampled simultaneously reducing labor costs for sampling. Based on the technical evaluation for the similar Cidra site, site-specific conditions, project objectives, cost, CDM's experience with the multi-level technology; CDM recommends installation of the FLUTe system at the San German Site.

The Flute System multiport well system will be installed in each of the bedrock boreholes described above. The results of the geophysical, hydraulic conductivity profiling, and low flow fracture zone sampling detailed above will be used to select the depths of ports. For cost estimating purposes it is assumed that 5 ports per well will be installed for a total of 50 ports.

Upon selection of the intervals to be monitored, the FLUTe multiport well assembly will be lowered inside the borehole to the target depths. The sampling ports will be spaced along the length of the open borehole at selected depths. Liners will be used to maintain isolation between sampling ports and to prevent cross contamination. A port interval will be installed in each monitoring zone. FLUTe multiport monitoring wells will be installed in accordance with manufacturer's instructions. The FLUTe manufacturer will install the wells. The CDM Hydrogeologist will direct and oversee the installation.

In general, multiport monitoring well systems do not allow for significant well development after installation. In general these systems do not allow pumping rates needed for thorough well development. Thorough development of the borehole will be performed before installation of the multiport system as described in Section 5.3.3.2.1. The objective of multiport well development will be to clear the sampling ports of any fines resulting from the installation process, ensure that the ports and other system components are operating properly, and perform an initial purge of the sampling system. Water quality parameters, including, turbidity, pH, temperature, conductivity, and dissolved oxygen will be monitored during development.

After development of the multiport system is complete, one round of samples will be collected for TCL VOCs. Sampling will occur a minimum of two weeks after development of the multiport system. Section 5.3.5 provides further details of the multiport monitoring well sampling events. Final multiport well installation procedures will be detailed in the QAPP.

Overburden Monitoring Well Installation

Based on the results of the groundwater screening program, overburden wells will be co-located with the deep multiport monitoring wells. Potential locations for overburden monitoring wells include locations where contamination was found in the overburden groundwater, locations within an identified source area and locations adjacent to the river and/or well field. For cost estimation purposes it is assumed that 10 overburden monitoring wells will be installed as part of the Southern field investigation. Well construction methods and materials (including screen slot size, diameter and filter pack material) detailed below are for cost estimation purposes and may be modified based on the geology encountered during drilling.

Overburden monitoring wells will be installed by the CDM drilling subcontractor using 6¼-inch inner diameter (ID) hollow stem augers with a center plug being advanced to the terminal depth of the well. The plug will be knocked free from the bottom of the augers, and the well will be set at the chosen depth. Monitoring wells will be constructed of 4-inch diameter polyvinyl chloride (PVC) casing and 0.010-inch slot PVC well screen. It is assumed that wells will be single-cased. The annulus around the well screen will be backfilled with morie #1 sand which will extend two feet above the well screen. A two-foot bentonite seal will be placed above the sand pack and the remaining annulus will be grouted to the surface. An eight-inch steel protective casing with a locking cap will be installed and a concrete collar will be poured around the well. Well drilling and construction details will be specified in the site-specific QAPP.

Monitoring well installation will not be considered complete until the wells have been fully developed. Development will be performed to remove drilling fluids, silts and well construction materials from the well and sand pack and to provide a good hydraulic connection between the well and the aquifer materials. Turbidity, pH, temperature, conductivity, and dissolved oxygen will be monitored during development. Development will continue until all parameters have stabilized (within 10 percent for successive measurements), the water is clear and there is a good hydraulic connection between the wells and the aquifer. In addition, during development of the test well flow rates and drawdown will also be measured to ensure that the well is sufficiently connected to the aquifer. Well development procedures will be detailed in the site-specific QAPP.

Synoptic Water Level Measurements

To provide data to evaluate groundwater flow, one round of synoptic water level measurements will be collected from the multiport monitoring wells in conjunction with the Southern field investigation sampling event.

Groundwater Sampling

After development of the wells is complete, one round of samples for TCL VOCs only will be collected from all overburden and bedrock multiport wells installed. Sampling will occur a minimum of two weeks after development of the wells. Section 5.3.5 provides further details of the monitoring well sampling events.

5.3.3.1.3 Technical Memorandum

A Technical Memorandum will be prepared at the conclusion of the Southern field investigation. The primary objectives of this technical memorandum are to: summarize the data collected during the investigation, develop a detailed site conceptual model, identify data gaps, and identify potential contaminant source areas or facilities. In addition, this technical memorandum will provide recommendations for the Northern field investigation, including the following:

- Final location and placement of overburden/multiport monitoring wells north of Rio Guanajibo
- Additional source area soil sampling (if needed)
- Locations for groundwater/surface water interaction evaluation
- Locations for surface water and sediment samples
- Recommendations for a potential aquifer test

5.3.3.2 Northern Hydrogeologic Field Investigation

The primary objectives of the Northern hydrogeological field investigations are to:

- Identify if residual contamination remains at any of the PSAs
- Define the boundaries of the contamination within the overburden and bedrock aquifer north of Rio Guanajibo
- Provide information on the hydraulic characteristics of the aquifers in north and south of the river
- Provide information on the relationship between Rio Guanajibo and groundwater in the vicinity of the PRASA well field
- Support development of remedial alternatives for groundwater in the FS.

To support the primary objectives, the following hydrogeologic investigation activities will be performed at the site:

- Well installation program
- Hydrogeologic investigation program

5.3.3.2.1 Well Installation Program

Following completion of the Southern field investigation, groundwater screening program at HP (Section 5.3.4.2) and after review of the data with EPA, CDM will install approximately 5 overburden monitoring wells and 5 FLUTe system multiport monitoring wells north of Rio Guanajibo. The wells will be installed in order to:

- Verify data identified during the groundwater screening program
- Refine the boundaries of VOC plume in the overburden and bedrock aquifer north of Rio Guanajibo
- Collect lithologic and stratigraphic data to refine the CSM
- Provide analytical data to support development of the FS

In order to complete this part of the field program, field tasks will be completed sequentially with each step being completed and data evaluated concurrently, to allow the next portion of the field program to be completed. This will require close communication between the EPA RPM and CDM team. The following activities will be performed as part of this program:

- Borehole drilling and coring
- Borehole geophysics
- Low flow fracture zone sampling
- Borehole hydraulic conductivity profiling
- Multiport well installation

- Overburden well installation

Figure 5-2 presents the proposed monitoring well locations north of Rio Guanajibo. Following review of the data generated during the Southern field investigation (Section 5.3.3.1) and the groundwater screening investigation at HP (Section 5.3.4.2) locations and depths for the multiport monitoring wells will be finalized.

Approximately five pairs (10 total) of monitoring wells will be completed north of the Rio Guanajibo with three located on or adjacent to the HP property, one background well and one well adjacent to the river north of the well field area.

Borehole Drilling and Coring
It is assumed that five boreholes will be drilled during the Northern field investigation. The five boreholes will be drilled using the air rotary drilling method. One of these boreholes will initially be drilled using the standard coring method (Figure 5-2). It is assumed that the boreholes will be drilled to a depth of 200 feet bgs. The drilling and development methods will be the same as those described in Section 5.3.3.1.2 - Borehole Drilling and Coring. Exact depths and locations of the Northern field investigation boreholes will be based on the technical memorandum and will be submitted to EPA for approval prior to drilling.

Borehole Geophysics
It is assumed that borehole logging will be conducted in the six boreholes drilled during the Northern field investigation. The Northern field investigation borehole geophysics methods and procedures are identical to those described in Section 5.3.3.1.2.

Borehole Hydraulic Conductivity Profiling
It is assumed that hydraulic conductivity profiling will be conducted in the five boreholes drilled during the Northern field investigation. The Northern field investigation hydraulic conductivity profiling objectives and procedures are identical to those described in Section 5.3.3.1.2.

Low Flow Fracture Zone Sampling
It is assumed that six fracture zone samples will be collected from each of the five boreholes proposed for the Northern field investigation for a total of 30 samples. The low flow fracture zone sampling objectives and procedures are the same as described in Section 5.3.3.1.2.

Multiport Monitoring Well Installation
A FLUTe System multiport well system will be installed in each of the five bedrock boreholes described above. The results of the geophysical and low flow fracture zone sampling detailed above will be used to select the depths of ports. For cost estimating purposes it is assumed that 5 ports per well will be installed for a total of 25 ports. The Northern field investigation multiport well installation procedures are identical to those described in Section 5.3.3.1.2.

Overburden Monitoring Well Installation

Based on the results of the groundwater screening program at HP, overburden wells will be co-located with the deep multiport monitoring wells. Potential locations for overburden monitoring wells include locations where contamination was found in the overburden groundwater, locations within an identified source area and locations adjacent to the river and/or well field. For cost estimation purposes it is assumed that five overburden monitoring wells will be installed as part of the Northern field investigation. Well construction methods and materials (including screen slot size, diameter and filter pack material) are identical to those described in Section 5.3.3.1.2

Synoptic Water Level Measurements

To provide data to evaluate groundwater flow, a round of synoptic water level measurements will be collected from the multiport monitoring wells in conjunction each Northern field investigation sampling event.

Groundwater Sampling

After development of the overburden and multiport wells is complete, two rounds of samples will be collected in all wells installed north and south of Rio Guanajibo. Sampling will occur a minimum of two weeks after development of the wells. Section 5.3.5 provides further details of the monitoring well sampling events.

5.3.3.3 Hydrogeologic Investigation Program (Optional)

Following completion of the Northern field investigation monitoring well installation program, CDM will consult with EPA on the necessity to perform a hydrogeologic investigation. The objectives of this hydrogeologic investigation are to provide additional information for the following purposes:

- Define the hydraulic properties of the overburden and bedrock units at the site
- Define the relationship between the Rio Guanajibo (and other surface water bodies) and groundwater in the vicinity of the site
- Support development of remedial alternatives for groundwater in the FS

CDM will conduct the following field investigations in support of these objectives.

- Hydraulic conductivity testing
- Groundwater/surface water interaction evaluation
- Aquifer testing

5.3.3.3.1 Hydraulic Conductivity Testing (Optional)

Slug Tests

Slug tests will be conducted at selected overburden monitoring wells that cover a range of depths, lithology types, and locations across the site. For cost estimation purposes, it is assumed that 8 of the 16 overburden monitoring wells will be slug tested.

Slug tests are a rapid and easy means to estimate hydraulic conductivity of an aquifer. Advantages of slug tests over pump tests include the fact that little or no contaminated water is produced, which then requires containment, sampling, and disposal as IDW or treatment at the pump test site prior to disposal. Disadvantages include that the hydraulic conductivity estimates are limited to a small volume of the aquifer around the borehole; slug tests may only measure the hydraulic conductivity of the sand pack around the well screen; or extrapolating the results from one well to other areas or intervals of the aquifer may be questionable.

Slug tests are conducted by adding (or removing/displacing) a known volume to (or from) the monitoring well to create a rapid rise (or fall) in water level. Water levels are measured as the water in the well returns to static (pre-test) conditions. Water is displaced with a weighted cylinder of known volume. The rate of water recovery is measured with a pressure transducer and data recorder. Both rising and falling head slug tests will be conducted. Slug test procedures will be fully detailed in the QAPP.

5.3.3.3.2 Groundwater/ Surface Water Interaction Evaluation

The objective of the groundwater/surface water interaction evaluation is to assess interaction between these two media in groundwater discharge areas. Discharge of contaminated groundwater to surface water has implications for the evaluation of human health and ecological risk. Current information is insufficient to evaluate the locations where contaminated groundwater may discharge to surface water. In concert with EPA, CDM will evaluate the contaminant profile and migration pathways developed over the course of the RI to determine if the surface water/groundwater interaction study shall be performed.

The groundwater/surface water interaction will be evaluated in the Rio Guanajibo. A staff gauge and five temporary drive-point piezometers will be installed in the streambed of the river. The locations of the temporary piezometers are shown on Figure 5-5. Two of the locations are adjacent to the PRASA well field to provide a better understanding of the potential connection between the former supply wells and the river. The three other locations are spaced along the river in areas of potential contaminated groundwater discharge based on the expected plume. These locations may be modified following review of data from the groundwater screening and well installation programs.

The temporary piezometers will consist of a drive-point screen 6 to 12-inches in length attached of stainless steel pipe. The screen will be driven three to four feet into the streambed. At each location, measurements will be taken of the water level inside the piezometer and the water level of the stream. Both measurements will be referenced to the same location at the top of the piezometer. The elevation and location of the top of each piezometer will be surveyed.

The staff gauge will consist of a calibrated scale affixed to a steel rod driven into the streambed. The top of the staff gauge will be surveyed so that water level measurements can be referenced to a known datum. The temporary piezometers and staff gauge will be installed at locations that are accessible by wading. A detailed description of the groundwater/surface water interaction investigation will be provided in the site-specific QAPP.

Long-Term Monitoring
Following completion of piezometer and staff gauge installation these sample locations will be used as part of a long-term groundwater monitoring program. The overall objective of the long-term water level monitoring program is to collect data to evaluate temporal fluctuations in water levels in the vicinity of the affected supply wells in response to precipitation and local pumping. The data will also be used to support the CSM and to evaluate groundwater flow. Long-term groundwater level monitoring will occur over a period of four weeks.

Monitoring will be conducted in four shallow and four bedrock monitoring wells, the supply wells and two streambed piezometers. The exact locations will be detailed in the QAPP. Data will be collected using in-situ water level monitoring instruments capable of storing water level data for the duration of the period and equipped with barometric pressure compensation (Level Troll or equivalent). To provide baseline water levels and to verify the water level measurements, manual water levels will be collected at the start of monitoring; at weekly intervals during monitoring; and at the conclusion of the monitoring. To ensure that the instruments are operating properly, monitoring instruments will be checked on a weekly basis and the data downloaded and checked. At the end of the monitoring period, the data will be downloaded and stored for evaluation. To evaluate precipitation effects on water levels, precipitation data for the monitoring period will be obtained from a local weather station.

Before initiating water level measurements, each well's location and elevation will be determined by a licensed land surveyor under subcontract to CDM. Elevation measurements will be made at marked water level measuring points on the steel casing and on the adjacent ground surface.

5.3.3.3.3 Aquifer Testing (Optional)
At the conclusion of the long-term monitoring program, the network of monitoring points will be used in conjunction with an aquifer test at one of the PRASA well field supply wells to provide information for the following purposes:

- Determine the connection of well field fractures to source areas.
- Provide more reliable hydraulic properties (transmissivity, storativity) of the bedrock aquifer
- Provide understanding of the affect of pumping on groundwater flow direction
- Investigate whether pumping at the PRASA well field may have drawn in water from the Rio Guanajibo

Prior to performing the pump test a short-term yield test will be performed at the test well to determine an appropriate pumping rate for the performance of the pump test. Prior to performing the yield test, estimates of the discharge rate will be determined from historic pumping rates at the supply well. For cost estimating purposes it is assumed that the yield test will be run for approximately 4 hours at rates between 100 and 400 gallons per minute (gpm). During the yield test, water levels will be monitored in the test well and surrounding wells with pressure transducers and recorded by automatic data loggers. In addition water levels will be checked by hand with water level probes to provide redundancy in data collection.

Following the yield test a pumping rate for the pump test will be selected based on the analysis of the yield test; for cost estimating purposes, the assumed rate is approximately 200 gpm.

The pump test will be performed at the site by pumping at the well field supply well. The type of test, short-term (e.g., 8 hour to 24 hour) or long-term (e.g., 24-hour to 72-hour), will need to be determined in the field and will depend on current site conditions. The pump test should be performed when the Rio Guanajibo is close to baseflow conditions preferably during the dry season (January to March). It is anticipated that the pump test will be performed by CDM personnel with support from the drilling subcontractor. The drilling subcontractor will be responsible for the setup and operation of the pump and a system to treat and contain the discharge water.

For cost estimating purposes, it is assumed that limited pumping (e.g., 8 hours) at one supply well, with a contingency to perform a longer (i.e., 24-hour) pump test will be performed. Use of the inactive supply well will require coordination with PRASA. CDM will contact PRASA and determine if it is feasible to use the supply wells as pumping and observation wells for the aquifer test.

The other supply wells, multiport and overburden monitoring wells (on both sides of the river) and riverbed piezometers will be used as monitoring points to observe drawdown during the pump test. Water levels will be measured by pressure transducers and recorded by automatic data loggers in supply wells, riverbed piezometers, and overburden monitoring wells. Since the installation of pressure transducers in multiport wells is an added expense to the normal installation, water levels in each port will be manually read once every hour during the test to determine if drawdown is occurring in these wells. Rainfall and barometric pressure will be measured during the pump testing phase. Manual measurements will also be taken periodically to verify transducer data. Following completion of the pump test recovery measurements will also be collected from the network of monitoring points previously discussed. Specific procedures for the aquifer tests will be provided in the QAPP.

Data generated from the aquifer test will be analyzed by a CDM Hydrogeologist in order to provide site-specific hydrogeologic properties to support design of potential remedial actions at the site.

5.3.4 Soil Borings, Drilling and Testing

The primary objectives of the PSA soil investigation and groundwater screening field investigations are to:

- Identify if residual contamination remains at any of the PSAs
- Define the boundaries of the contamination within the overburden aquifer through groundwater screening.

5.3.4.1 PSA Investigation

Following the PSA inspections, a PSA investigation will be performed to provide data to aid in the following assessments:

- Evaluate properties with confirmed PCE contamination during pre-remedial sampling and PSA source area inspections
- Identify if residual contamination remains at any of the PSAs
- Provide data to support the design and construction of permanent monitoring wells

PSA investigations will be initiated based on reviews of information generated during the PSA inspection activities, except for Wallace and Acorn, for which PSA investigations are already assumed. Conditions which would warrant a PSA investigation are the presence or likely presence of any site-specific compounds (SSCs) on a PSA under conditions that indicate an existing release, a past release, or a material threat of a release of these SSCs into structures on the property or into the ground, groundwater, or surface water of the property. For costing purposes, CDM assumes that one of the PSAs listed below will warrant a subsequent PSA investigation:

- RIP area: Baytex, CC Label, Garaje Rodriguez, and GE
- North of the river: Cordis/OMJ, Baxter, Abandoned Gulf, and HP

It is possible that additional properties may warrant PSA investigations, as the PSA inspection task (Section 5.3.1.1) includes the potential identification of PSAs. CDM assumes EPA will be responsible for obtaining access to the properties listed above and any additional PSAs identified.

CDM assumes that each PSA investigation will include 10 borings. The number of investigation and sample locations are for cost estimation purposes and could be adjusted based on the results of the PSA inspections. The locations of the borings will be biased toward locations of storage and potential release or disposal of hazardous substances, or in locations to fill data gaps.

Soil Sampling

Soil borings will be advanced at each location via direct-push technology (DPT). The estimated number of borings to be completed is 20 (10 at each of Wallace and Acorn properties). At each sampling location, 4-foot core samples will be collected continuously using DPT drilling rigs, starting at the surface and proceeding until water is encountered. Upon retrieval from the sampler, each four-foot sample will be screened for VOCs using a photo-ionization detector (PID). The lithology of each sample will be characterized and logged by the field geologist.

At each boring, subsurface soil samples will be collected at 0 to 2 feet, 5 to 7 feet, and every 10 feet from 10 feet bgs to the water table. Based on historical sampling the water table should be between 20 and 30 ft bgs. Sample depths may be modified based on results of the field screening with the PID. For cost estimating purposes it is assumed that 4 soil samples will be collected from each of the PSA investigation borings for a total of 80 samples.

Each soil sample will be analyzed for TCL trace VOCs and moisture content. In addition, for cost estimating purposes it is assumed that the 0 to 2 feet (surface soil) and 5 to 7 feet soil samples will be analyzed for total organic carbon (TOC), grain size, TCL semi-volatile organic compounds (SVOCs), PCBs, pesticides and TAL metals. A summary of the analyses proposed for each boring is presented on Table 5-2. Sampling procedures will be detailed in the QAPP.

Discrete Groundwater Sampling

In addition to the soil sampling at each boring, discrete groundwater samples will be collected to establish a profile of groundwater contamination at the PSAs. Once the water table is established during soil sampling, a DPT probe fitted with a screen will be driven to the top of bedrock. A groundwater screening sample will be collected at the terminal depth, and then sampling will proceed upward, toward the ground surface with samples collected at 10-foot intervals. The final sample will be collected at a depth of two feet below the groundwater surface. For cost estimating purposes it is assumed that 3 discrete groundwater samples will be collected at each boring for a total of 60 samples.

A peristaltic pump and polyethylene tubing will be used to purge the well point. The DPT rods will be purged to clear the screen of fines and to produce as clear a sample as possible. Each sampling interval will be purged before it is sampled to ensure that the groundwater is representative of the sampled interval. Purge water will be monitored for pH, conductivity, temperature, dissolved oxygen, and turbidity. Once the monitoring parameters have stabilized samples will be collected using polyethylene tubing fitted with a check valve.

Samples will be shipped to a fixed-base laboratory for TCL Trace VOC analysis on a 24-hour turnaround basis. Laboratory services will be obtained using EPA's FASTAC strategy as described in Section 4.2. A summary of the analyses proposed for the discrete groundwater samples is presented on Table 5-2. Sampling procedures will be detailed in the QAPP.

Additional PSA Investigations

As stated above CDM assumes that one additional PSA investigation will be performed. This additional PSA investigation is included under the Southern Investigation.

The field investigations at this additional PSA will be scoped similar to the other PSA investigations. For cost estimation purposes it is assumed 10 borings will be advanced at each PSA with 4 soil and 3 discrete groundwater samples collected as described above. A summary of the analyses proposed for this sampling is presented on Table 5-2.

5.3.4.2 Groundwater Screening Investigation

Groundwater screening investigations will be performed during both the Southern and Northern Investigations. The objective of the Southern Groundwater Screening Investigation is to delineate contaminant migration in overburden groundwater from Wallace, RIP, and Acorn. The Northern Groundwater Screening Investigation is designed to determine if VOC contamination is migrating in overburden groundwater from the HP parcel.

5.3.4.2.1 Southern Groundwater Screening Investigation

The southern groundwater screening investigation will be performed to delineate the movement of contaminants from Wallace, RIP and Acorn Dry Cleaning to downgradient receptors such as the Rio Guanajibo or the PRASA well field. CDM's technical approach includes elements from EPA's Triad guidance. The groundwater screening program employs a dynamic sampling approach intended to refine and refocus the investigation (sample locations and sample depths) based on accelerated decision-making. Data from the previous day's samples will be used to make decisions about subsequent sampling locations and will refine the site's preliminary CSM as the investigation proceeds. Regular discussions will be held with the EPA RPM and technical staff regarding the progress of sampling and to modify sample locations and depths. This strategy will reduce cost by limiting the number of monitoring wells to those strictly necessary to delineate the nature and extent of the plume and identify source areas. It will facilitate subsequent placement of the wells at appropriate locations and depths. Groundwater screening will be performed to fill data gaps. The objectives of the southern groundwater screening program are to:

- Identify properties from which VOC contamination may be migrating
- Identify the lateral and vertical boundaries of VOC contamination in the overburden, both the alluvium and saprolite (weathered bedrock)
- Provide data to support the design and construction of permanent monitoring wells
- Provide preliminary information on lithology of the overburden aquifer

Screening transects will be advanced normal to the assumed plume axis, as best as possible based on property access and physical restrictions. Screening will start adjacent to the Wallace facility, at the intersection of Calle A and Calle B, and progress downgradient (assumed to be northwest) in a step-wise manner both longitudinally (southeast to northwest, or along the axis of the plume) and laterally (southwest to northeast, or normal to the assumed plume axis) along the projected path of the plume. Transects shall also be advanced similarly in the upgradient (southeast) direction, sufficient to characterize groundwater within RIP, in the direction of the wellfield (see Figure 5-4). For cost estimating purposes it is assumed that 55 groundwater screening borings will be completed as part of this investigation.

Because of the time lag between sample collection and analysis, sampling may not be sequentially completed in a given transect prior to initiating the next transect. The exact progression of screening locations will be coordinated continuously between EPA, CDM's field team and office staff, and the drilling subcontractor.

The first location to be screened in any transect will be where the highest contaminant concentrations are expected (in theory, the central location of the transect). The necessity of progressive lateral outstep sampling locations in any given transect will be determined based on the analytical results from previous sampling locations in that transect, except for the initial two transects downgradient of the Wallace facility which will be advanced regardless of analytical results. Sampling will progress laterally until no analyte is present above MCLs. EPA and CDM may together eliminate sampling intervals over the course of the program as the vertical extent of the groundwater plume is refined.

Sampling Methods

To establish a profile of groundwater contamination, at each groundwater screening location, a DPT probe fitted with a screen will be driven to the top of bedrock. Based on historical investigations bedrock is approximately 30 to 50 ft bgs. A groundwater screening sample will be collected at the terminal depth. Sampling will proceed upward, toward the ground surface, from the terminal depth. Groundwater samples will be collected at 10-foot intervals at all of the screening points. The final sample will be collected at a depth of two feet below the groundwater surface. For cost estimating purposes it is assumed that 3 groundwater screening samples will be collected at each boring for a total of 165 samples.

A peristaltic pump and polyethylene tubing will be used to purge the well point. The DPT rods will be purged to clear the screen of fines and to produce as clear a sample as possible. Each sampling interval will be purged before it is sampled to ensure that the groundwater is representative of the sampled interval. Purge water will be monitored for pH, conductivity, temperature, dissolved oxygen, and turbidity. Once the monitoring parameters have stabilized samples will be collected using polyethylene tubing fitted with a check valve.

Samples will be shipped to a fixed-base laboratory for low concentration VOC analysis on a 24-hour turnaround basis. Laboratory services will be obtained using EPA's FASTAC strategy as described in Section 4.2. A detailed summary of the analyses proposed for the groundwater screening investigation is presented on Table 5-2. Sampling procedures will be detailed in the QAPP.

Lithologic Sampling and Logging

Subsurface soil samples will be collected at several groundwater screening locations to provide lithologic information to enhance the CSM and to support selection of permanent monitoring well locations and construction materials. Soil samples will be collected at one location per transect in the southern groundwater screening area. For cost estimation purposes it is assumed that lithologic samples will be collected at 9 borings to a depth of 50-ft bgs.

At each lithologic sampling location, 4-foot core samples will be collected at 10-foot intervals using DPT, starting at the surface and proceeding to the terminal depth of the boring. An estimated total of 54 samples will be collected for lithologic logging. Lithologic sampling and logging procedures will be detailed in the QAPP.

Groundwater Screening Investigation Technical Meeting
At the conclusion of the groundwater screening program, CDM will summarize and evaluate the groundwater screening data and propose locations and depths for permanent monitoring wells. CDM will attend a meeting with EPA to obtain input on and finalize the locations of the proposed monitoring well locations. Following the meeting with EPA, CDM will prepare and submit meeting minutes summarizing the conclusions of the meeting.

5.3.4.2.2 Northern Groundwater Screening Investigation

The Northern groundwater screening investigation will be performed to determine if VOC contamination has migrated south from the HP. HP is performing a voluntary remediation program at the facility which consists of extraction wells and monitoring wells. To date no overburden or bedrock wells have been installed south of the facility to monitor potential groundwater flow south toward the river. The objectives of the northern groundwater screening program are to:

- Identify if VOC contamination in the overburden, both the alluvium and saprolite (weathered bedrock) may be migrating south toward Rio Guanajibo
- Provide data to support the design and construction of permanent monitoring wells
- Provide preliminary information on lithology of the overburden aquifer offsite and to the south of HP

For cost estimating purposes it is assumed that one transect of 10 groundwater screening borings will be completed as part of this investigation (see Figure 5-5).

Sampling Methods
To establish a profile of groundwater contamination, at each groundwater screening location, a DPT probe fitted with a screen will be driven to the top of bedrock. Based on historical investigations bedrock is approximately 30 to 50 ft bgs. A groundwater screening sample will be collected at the terminal depth. Sampling will proceed upward, toward the ground surface, from the terminal depth. Groundwater samples will be collected at 10-foot intervals at all of the screening points. The final sample will be collected at a depth of two feet below the groundwater surface. For cost estimating purposes it is assumed that 3 groundwater screening samples will be collected at each boring for a total of 30 samples.

A peristaltic pump and polyethylene tubing will be used to purge the well point. The DPT rods will be purged to clear the screen of fines and to produce as clear a sample as possible. Each sampling interval will be purged before it is sampled to ensure that the groundwater is representative of the sampled interval. Purge water will be monitored for pH, conductivity, temperature, dissolved oxygen, and turbidity. Once the monitoring parameters have stabilized samples will be collected using polyethylene tubing fitted with a check valve.

Samples will be shipped to a fixed-base laboratory for low concentration VOC analysis on a 24-hour turnaround basis. Laboratory services will be obtained using EPA's FASTAC strategy as described in Section 4.2. A detailed summary of the analyses proposed for the groundwater screening investigation is presented on Table 5-2. Sampling procedures will be detailed in the QAPP.

Lithologic Sampling and Logging

Subsurface soil samples will be collected at several groundwater screening locations to provide lithologic information to enhance the CSM and to support selection of permanent monitoring well locations and construction materials. Soil samples will be collected at approximately two locations in the northern groundwater screening area offsite of HP. For cost estimation purposes it is assumed that lithologic samples will be collected at 2 borings to a depth of 50-ft bgs.

At each lithologic sampling location, 4-foot core samples will be collected at 10-foot intervals using DPT, starting at the surface and proceeding to the terminal depth of the boring. An estimated total of 12 samples will be collected for lithologic logging. Lithologic sampling and logging procedures will be detailed in the QAPP.

Groundwater Screening Investigation Technical Meeting

At the conclusion of the Northern groundwater screening program, CDM will summarize and evaluate the groundwater screening data and propose locations and depths for permanent monitoring wells. CDM will attend a meeting with EPA to obtain input on and finalize the locations of the proposed monitoring well locations. Following the meeting with EPA, CDM will prepare and submit meeting minutes summarizing the conclusions of the meeting.

5.3.5 Environmental Sampling

Table 5-2 summarizes the number of samples and associated analytical parameters for the various environmental media that will be sampled during the RI. The FASTAC procedures will be followed. Unless otherwise specified, analysis for TCL/TAL parameters through the CLP will be performed in accordance with the most current EPA CLP SOWs for multi-media, multi-concentration analyses for organics and inorganics. Non-RAS parameters will be analyzed by EPA's DESA laboratory or CDM's analytical laboratory subcontractor. The laboratory subcontractor will be selected by EPA-approved criteria and will follow the most current EPA protocols and Region 2 QA requirements. The CDM Regional Quality Assurance Coordinator (RQAC) will ensure the laboratory meets all EPA requirements for laboratory services. QC samples will be collected in addition to the environmental samples discussed below. The number and type of QC samples will be in accordance with the EPA Region 2 CERCLA QA Manual.

5.3.5.1 Groundwater Sampling

One round of groundwater sampling will be performed during the Southern Investigation, and two rounds are proposed for the Northern Investigation.

5.3.5.1.1 Southern Groundwater Sampling

One round of groundwater samples will be collected from the 10 new multiport monitoring wells (50 ports), and 10 new overburden monitoring wells installed south of Rio Guanajibo. The purpose of this round is to profile the nature and extent of

VOC contamination downgradient of Wallace, and other potential RIP source areas. The samples will be analyzed for TCL trace VOCs only.

A round of synoptic water level measurements will be collected from the multiport monitoring wells prior to initiating sampling. Multiport wells will be sampled using the FLUTe System specific sampling equipment and procedures. Conventional monitoring wells will be purged with a Grundfos Rediflow 2 submersible pump and sampled according to the site-specific low-flow, minimal drawdown sampling procedure, which follows the EPA SOP "Ground Water Sampling Procedure, Low Stress (Low Flow) Purging and Sampling" (EPA 1998). Groundwater sampling procedures will be fully detailed in the site-specific QAPP.

5.3.5.1.2 Southern and Northern Groundwater Sampling

Two rounds of groundwater samples will be collected from the 15 new multiport monitoring wells (75 ports), and 15 new overburden monitoring wells installed north and south of Rio Guanajibo. The purpose of these rounds is to characterize the nature and extent of contamination in groundwater from contaminants associated with the site. Analytical data from groundwater sampling will be used to support preparation of the RI, HHRA, and FS reports. If the possible, one round of samples will be collected during the dry season (January to March) and one will be collected at times of high water levels. These sampling events maybe modified based on schedule constraints. It is anticipated the Round 2 will occur three months after Round 1.

A round of synoptic water level measurements will be collected from the multiport monitoring wells prior to initiating sampling. Multiport wells will be sampled using the FLUTe System specific sampling equipment and procedures. Conventional monitoring wells will be purged with a Grundfos Rediflow 2 submersible pump and sampled according to the site-specific low-flow, minimal drawdown sampling procedure, which follows the EPA SOP "Ground Water Sampling Procedure, Low Stress (Low Flow) Purging and Sampling" (EPA 1998). Groundwater sampling procedures will be fully detailed in the site-specific QAPP.

Groundwater samples will be analyzed for TCL trace VOCs, TCL SVOCs, pesticides/PCBs, and TAL inorganics. To support evaluation of natural attenuation of VOCs in groundwater, approximately 2 samples from each multiport well and 4 of the 15 overburden wells (34 samples total) will be analyzed for the following parameters: chloride, methane, ethane, ethene, nitrate/nitrite, sulfate, sulfide, ferrous iron, and TOC (EPA 1999a). These samples will also be analyzed for water quality parameters including total suspended solids (TSS), total dissolved solids (TDS), alkalinity, ammonia, hardness, and total Kjeldahl nitrogen (TKN). Dissolved oxygen, oxidation-reduction potential (as Eh), turbidity, temperature, ferrous iron and conductivity will be measured in the field. A flow-through cell will be used when measuring oxygen-sensitive field parameters.

5.3.5.2 Sediment and Surface Water Sampling Program

Surface water, groundwater seepage and sediment samples will be collected to characterize the nature and extent of contamination in order to support the RI, HHRA, and SLERA. Other objectives of the sampling include:

- Determine if contaminated groundwater has impacted Rio Guanajibo surface water and sediment
- Determine if contaminants are present within PSA drainage structures and if this contamination impacts media at identified points of discharge
- Determine if sediment contamination exists in surface water drainage structures located beyond the boundaries of these facilities

Since the site is currently identified as groundwater contamination with an unknown source (EPA 2007b), the major pathway for contamination of surface water and sediment is via discharge of contaminated groundwater to the water bodies. In addition, during the PSA reconnaissance, catch basins and other surface water structures on and leading from PSAs will be identified. Accordingly, the surface water and sediment program focuses on those areas where contaminated groundwater is expected to discharge.

One round of surface water and sediment samples will be collected at 7 locations in the Rio Guanajibo and 5 locations along a tributary leading to the river (12 total). Surface water and sediment samples will be collected from the stream and streambed, respectively. In addition, one groundwater seepage sample will be collected from each of the five temporary piezometers installed as part of the groundwater/surface water interaction investigation described in Section 5.3.3.3.2.

The location of the surface water, sediment, and groundwater/surface water interaction temporary piezometer samples are shown on Figure 5-6. Specific locations of the surface water and sediment samples in the field will be based on actual field conditions (such as amount of sediment available) and biased towards sedimentation locations (such as the slower flowing portions or the inside of stream bends, where lower flow velocities promote sediment deposition). Additional downstream sediment samples will be recommended to EPA if contamination is found in the furthest downgradient sample.

Surface water and sediment samples will also be collected from catch basins and channels identified during the PSA reconnaissance. For cost estimating purposes it is assumed that 12 surface water and sediment samples will be collected from these structures. Sampling procedures will be detailed in the QAPP.

Sediment samples will be collected from a depth of 0 to 6 inches below the sediment surface. Surface water samples will be collected directly into the sample containers. Temporary piezometer groundwater seepage samples will be collected with a bailer. A minimum of three volumes of water will be purged from each piezometer prior to sampling. After the bailed samples are taken, diffusion bags will be placed inside the piezometers to collect VOCs for a time-weighted average concentration over two days. Both water and sediment samples will be collected using EPA-approved methodologies which will be fully detailed in the QAPP.

Surface water and groundwater seepage samples collected from the above locations will be analyzed for trace level VOCs, TCL SVOCs, pesticides/PCBs, and TAL metals, cyanide, alkalinity, ammonia, hardness, nitrate/nitrite, TKN, sulfate, sulfide, chloride, TOC, TDS, and TSS. In addition, CDM will collect field measurements including temperature, conductivity, pH, turbidity, dissolved oxygen, and redox potential (as Eh) at each surface water sampling location and at each temporary piezometer sample location.

Sediment samples will be analyzed for full TCL/TAL parameters, grain size, pH, and TOC.

5.3.5.3 Sub-Slab and Indoor Air Samples (Optional)

There is a potential for VOC contamination to migrate as vapor to structures near the impacted areas and affect indoor air quality. Vapor intrusion is assessed by collecting sub-slab air samples (below basements or foundation slabs) and air samples from interior spaces of residences or other structures. Currently, information about the depth and lateral extent of the plume and the nature of materials between the groundwater plume and the surface are not known. The location of the contaminant source or sources is currently unknown and the specific contaminants to target for sub-slab and vapor sampling have not been defined. Vapor intrusion samples are contingent upon the results of the other activities proposed in the work plan, therefore, sub-slab and indoor air sampling are considered to be optional and will be performed only with EPA's approval.

CDM will evaluate the distribution of VOCs in groundwater based on the screening survey and monitoring well data. If VOCs are present within 100 feet vertically or horizontally of occupied structures, or within soil in source areas, CDM will prepare a letter report defining the estimated boundaries of the contamination and identifying potentially impacted residences or buildings. The letter report will recommend locations for sub-slab and indoor air sampling. CDM will discuss the recommendations with EPA and upon EPA's approval, will conduct sub-slab sampling at the targeted building(s). Indoor air sampling will be conducted if the sub-slab sampling results indicate the potential for indoor migration of VOCs to indoor air.

Installation of sub-slab probes and air sampling will be conducted in accordance with the Draft Guidance for Evaluation of the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (EPA 2002 or most current version).

For cost estimating purposes, it is assumed that four initial sub-slab samples and four concurrent sub-slab/indoor air samples (eight samples total) will be collected from residences or other occupied structures in San German. The concurrent subslab/indoor air samples will be collected only if VOCs are detected in the initial sub-slab samples. If indoor air sampling is conducted, it is estimated that one ambient air sample will be collected in conjunction with the indoor air sampling.

Sub-slab sampling will require installation of sampling ports through the slabs on the buildings. A 1.5-inch diameter hole will be drilled through the concrete slab so a stainless steel tube can be pushed one foot into the material below the slab for vapor testing. One air canister will be placed in the ground floor of each building for 24 hours. Upon retrieval, the air samples will be shipped to the laboratory for VOC analysis using EPA Method TO-15 with SUMMA canisters. Specific VOC compounds will be selected based on the results of the groundwater screening and monitoring well sampling. Procedures for air vapor sampling will be detailed in the site-specific QAPP.

Indoor air samples will be collected from the main living floor of the home if VOCs are detected above levels of concern specified by Region 2 in the initial subslab samples. In order to prevent interference, crawl space vents (if present) will be closed prior to conducting indoor air sampling. The field team will survey the area for any household products or conditions that could affect the indoor air sampling results. For the concurrent sampling, one air canister will be placed in the main living floor of the home and one canister will monitor sub-slab vapors for a period of 24 hours. Ambient air samples will be collected upwind of the sampling area, concurrently with the indoor air samples. Upon retrieval, the air samples will be shipped to the laboratory for VOC analysis using EPA Method TO-15 with SUMMA canisters. Specific VOC compounds will be selected based on the results of the groundwater screening and monitoring well sampling. Procedures for air vapor sampling will be detailed in the site-specific QAPP.

5.3.6 Ecological Characterization

An ecological field investigation of the site will be conducted to characterize ecological conditions along potential contaminant migration pathways to support the RI and SLERA.

Activities conducted in support of the ecological characterization included a review of existing information, an ecological field investigation for habitat characterization, and identification of federal- and Commonwealth-listed threatened/endangered species and critical habitats.

5.3.6.1 Habitat Characterization

The purpose of this field characterization is to identify ecological conditions on and in areas nearby the site that are potentially affected by the migration of site contaminants. Site conditions and conditions of the adjacent area will be visually inspected. Observations on habitat conditions, wildlife utilization, and contaminant exposure pathways will be made and include the following types of ecological information:

- Vegetation cover types on and in areas immediately adjacent to the site
- Dominant vegetation species and general visual observations of abundance/diversity
- Topographic features (e.g., drainages)
- Location of surface waters and their general aquatic habitat characteristics (e.g., approximate size, flow and direction, bottom substrate, and plant coverage)

- Observations of wildlife use, including (to the extent practicable) species identification and type of usage
- Indications of environmental stress that could be related to site contaminants

The results of this characterization will be provided in the SLERA and in the ecological characterization section of the RI report.

5.3.6.2 Identification of Threatened and Endangered Species and Critical Habitats

The information on Commonwealth and federal-listed threatened, endangered or rare species will be requested from the U.S. Fish and Wildlife Service through EPA Region 2, and the Puerto Rico Department of Natural Resources. The presence of any Commonwealth or federal-listed threatened or endangered species or significant habitats at the site or surrounding area will be determined. Information received under this activity will be reviewed and presented in the ecological risk assessment and ecological characterization section of the RI report.

5.3.7 Geotechnical Survey

This subtask is not required at this time. Any subsurface clearance performed in support of drilling activities will be the responsibility of the associated subcontractor.

5.3.8 Investigation – Derived Waste Characterization and Disposal

CDM will procure a subcontractor that will be responsible for the removal and proper disposal of all RI generated waste soils, liquids, solids, and personal protective equipment. Representative waste samples will be collected and analyzed by a laboratory to characterize the IDW. A technical SOW will be prepared for the procurement of the waste hauling and disposal subcontractor. CDM will conduct field oversight and H&S monitoring during all waste disposal field activities.

5.4 Task 4 - Sample Analysis

Section 5.3 and Table 5-2 specify the analyses for each type of samples. Details are summarized below.

- **Existing Well Samples:** TCL Trace VOCs

- **PSA Investigation Soil Samples:** TCL Trace VOCs, with 24-hour turn-around for faxed results.

- **PSA Investigation Discrete Groundwater Samples:** TCL Trace VOCs, with 24-hour turn-around for faxed results.

- **Groundwater Screening Investigation Samples**: TCL Trace VOCs, with 24-hour turn-around for faxed results.

- **Surface Water and Groundwater Seepage Samples**: Surface water samples will be analyzed for TCL Trace VOCs, TCL SVOCs, pesticides/PCBs, TAL metals, cyanide, hardness, alkalinity, ammonia, nitrate/nitrite, TKN, sulfate, sulfide, chloride, TOC, TDS, and TSS.

- **Sediment Samples**: Sediment samples will be analyzed for full TCL/TAL parameters, grain size, pH, and TOC.

- **Monitoring Well Samples**: Monitoring well samples will be analyzed for TCL Trace VOCs, TCL SVOCs, pesticides/PCBs, TAL metals, cyanide, chloride, methane, ethane, ethene, nitrate/nitrite, sulfate, sulfide, TOC, TSS, TDS, ammonia, hardness, and TKN. Ferrous iron analysis will be conducted onsite.

- **Sub-Slab and Indoor Air Samples (Optional)**: Sub-slab and indoor air samples will be analyzed for selected VOCs based on groundwater screening and monitoring well data by the EPA Method TO-15 method by an EPA laboratory through the Flexibility Clause.

5.4.1 Innovative Methods/Field Screening Sample Analysis

This subtask is not applicable to the remedial investigation.

5.4.2 Analytical Services Provided via CLP or DESA

Sections 5.3.4 and 5.3.5 present the sampling program including those samples to be submitted for analysis by the EPA CLP. Table 5-2 summarizes the sampling program. Samples will be analyzed in compliance with the FASTAC procedure described in Section 4.2.3.

5.4.3 Subcontractor Laboratory for Non-RAS Analyses

Samples will be analyzed in compliance with the FASTAC procedure described in Section 4.2.3. If DESA does not have capacity to analyze the non-RAS samples, the samples will be analyzed by a subcontract laboratory.

CDM will select a laboratory subcontractor based on the ability to meet analytical QA and QC requirements in the project-specific SOWs for non-RAS analytical services. The laboratory subcontractor will be selected by EPA-approved criteria and will follow the most current EPA protocols and Region 2 QA requirements. The CDM review procedures will ensure that the laboratory meets all EPA requirements for laboratory services. CDM has provided EPA with copies of the QA manuals and/or QA plans of the BOA subcontract laboratories. CDM will monitor the subcontractor laboratory's analytical performance.

The number of samples and analytical parameters are defined on Table 5-2. The analytical test methods, detection limits, holding times, parameters, field sample preservation, and QC samples will be provided in the QAPP.

5.5 Task 5 - Analytical Support and Data

CDM will validate the non-RAS environmental samples (except samples analyzed by EPA's DESA laboratory) collected under Task 3; EPA will validate all other RAS analytical data generated under the other tasks of the RI.

5.5.1 Collect, Prepare and Ship Samples

Sample preparation and shipment is included under Task 3.

5.5.2 Sample Management

The CDM Analytical Services Coordinator (ASC) will be responsible for all RAS CLP laboratory bookings and coordination with the Sample Management Office (SMO), RSCC, DESA, and/or other EPA sample management offices for sample tracking prior to and after sampling events.

For all RAS activities, CDM will notify the Contract Laboratory Analytical Support Services (CLASS) to enable them to track the shipment of samples from the field to the laboratories and to ensure timely laboratory receipt of samples. Sample trip reports will be sent directly to the RSCC and the EPA RPM within seven working days of final sample shipment, with a copy sent to the CDM ASC.

The CLP laboratories will be responsible for providing organic and inorganic analytical data packages to EPA for data validation.

Samples analyzed by the DESA laboratory and/or the subcontract laboratory will be coordinated by the ASC. All analytical data packages from the subcontract laboratory will be sent directly to CDM for data validation. If requested, CDM will send these validated data packages to EPA for QA review purposes. The data will be delivered in a format conducive to database input. CDM will provide the subcontract laboratory with a format for the electronic data deliverable.

5.5.3 Data Validation

All analytical data from the CLP will be validated by EPA. Analytical data from DESA will be validated by DESA. CDM will validate any data from the subcontract laboratory. The validation will determine the usability of the data by reviewing the analytical results against validation criteria. All validated data results will be presented in an appendix to the RI report.

Data validation will verify that the analytical results were obtained following the protocols specified in the CLP SOW, and are of sufficient quality to be relied upon to prepare an HHRA, an RI report, and to support a ROD.

5.6 Task 6 - Data Evaluation

This task will begin with the full evaluation of existing data. This task will also include efforts related to the compilation of RI analytical and field data collected during the field activities which will be entered into CDM's database in a format that is compatible with EPA's Region 2 Geographic Information System (GIS). All validated data will be entered into a computer database and tabulated for use in the RI and RA. The data from the RI along with the data from the previous sampling efforts will be reviewed and carefully evaluated to identify the nature and extent of site-related contamination. Upon EPA direction, all data will be submitted to EPA's Information Services Branch (ISB) for the purposes of updating EPA's GIS database related to the site.

5.6.1 Data Usability Evaluation

CDM will evaluate the usability of the field investigation data including any uncertainties associated with the data. Previous investigations had different goals and data quality requirements that may influence the extent to which these data can be used in the RI/FS or risk assessments. Field sampling techniques, laboratory analytical methods and techniques, and data validation will all be considered in evaluating the usability of the data. Data usability will be evaluated against the DQOs for the RI and risk assessments, as defined in the QAPP, prior to use in these reports. Any qualifications to the data usability will be discussed in the QA section of any reports presenting data.

5.6.2 Data Reduction, Tabulation and Evaluation

CDM will evaluate, interpret, and tabulate data in an appropriate presentation format for final data tables. In accordance with the EPA SOW, the following will be used as general guidelines in the preparation of data for the RI report:

- Tables of analytical results will be organized in a logical manner such as by sample location number, sampling zone, or some other logical format. CDM will coordinate the table organization with the EPA RPM and EPA's ISB.
- Analytical results will not be organized by laboratory identification numbers because these numbers do not correspond to those used on sample location maps. The sample location/well identification number will always be used as the primary reference for the analytical results. The sample location number will also be indicated if the laboratory sample identification number is used.
- Analytical tables will indicate the sample collection dates.
- The detection limit will be indicated in instances where a parameter was not detected.
- Analytical results will be reported in the text, tables and figures using a consistent and conventional unit of measurement such as μg/L for groundwater analyses and milligram per kilogram (mg/kg) for soil analyses.
- Protocol for eliminating field sample analytical results based on laboratory/field blank contamination results will be clearly explained.
- If the reported result has passed established data validation procedures, it will be considered valid.
- Field equipment rinsate blank analyses results will be discussed in detail if decontamination solvents are believed to have contaminated field samples.

Detailed information, concerning the hydrogeological and physical characteristics of the site and the surrounding area, will be gathered, reviewed, and evaluated for inclusion in the RI report. The purpose of these activities will be to provide detailed descriptions of the site physical features and to assess how these features may impact interpretations regarding contaminant source areas and potential migration paths.

Data Mapping

The RI data will be posted on site base maps for the RI/FS. Figures will be generated in plan view and cross section to show the extent of soil, surface water, sediment, and groundwater contamination. Graphic illustrations in the RI Report will include geological profiles, contaminant isoconcentration maps, and relevant historical data and areas of concern.

CDM will create a GIS to facilitate spatial analysis of the data and to generate graphics for reports and presentations. The GIS will have geographic base layers consisting of various kinds of maps that depict regional and local physiographic features such as roads, buildings, water bodies, railroads, and topography. Site-specific features derived from the site and study area survey results will be added to complete the base layers. As samples are collected, the locations will be registered in the GIS. Historical and current analytical results for each sample location will be added, creating the capability to conduct functional spatial queries of the data to show where parameters of interest are sampled and detected by date and depth. This functionality will be used to support data interpretation for preparation of the RI report.

The GIS will also serve as the primary platform for generation of graphics to support both the RI and FS reports and presentations such as public meetings. Figures will be generated in plan view and cross section as needed to define the site stratigraphy and identify perched water zones and contaminant distribution. Graphic illustrations in the data evaluation report and/or the RI report will include geological profiles, cross-sections, and contaminant iso-concentration maps. Plan view maps and figures will be generated using GIS to facilitate plan-view spatial data analysis. Figures will be generated to illustrate site features, historical sample locations, historical sampling results, current sample locations, current sampling results and locations where sample data exceeds regulatory standards or guidelines.

Database Management

CDM will use an appropriate database program and standard industry spreadsheet software programs for managing all data related to the RI sampling programs. This software will assist in managing large volumes of data. The system will provide data storage, retrieval, and analysis capabilities, and be able to interface with a variety of spreadsheet, word processing, statistical, and graphics software packages to meet the full range of site and media sampling requirements for an RI/FS. Analytical data results will interface with graphics packages to illustrate contaminants detected.

Data collected during all field activities will be organized, formatted, and input into the database for use in the data evaluation phase. All data entry will be checked for quality control. Data tables comparing the results of the various phases of sampling efforts will be prepared and evaluated. Data tables will also be prepared that compare analytical results with both state and federal ARARs.

5.6.3 Modeling (Optional)

Groundwater modeling is not required by EPA at this time. If during the course of this RI/FS a modeling effort is requested by EPA, EPA will issue an amendment to this work assignment. CDM will then perform an initial assessment and submit recommendations to EPA.

For the initial modeling assessment, relevant and available site data will be reviewed, including technical documents/reports and raw data from adjacent (and offsite) areas that may be within the anticipated model domain. Some of the analytical work required to make the assessment will already have been carried out during the RI. The initial modeling assessment will include the following activities:

- Review of:
  - Regional hydrogeological setting of the site
  - Site-specific data:
    - Nature and extent of contamination
    - Hydraulic properties of the aquifer(s)
    - Geometry and lithology of the aquifer(s)
  - Potential model boundaries and boundary conditions
  - Data accuracy and adequacy

- Preparation of recommendations section

Until the initial data review and modeling assessment is carried out, definition of a technical approach for site modeling is considered to be premature. If EPA concurs with any recommendations for modeling, then a detailed work plan and an associated modeling budget will be prepared for EPA's review. This work plan would detail the technical approach and outline specific tasks to be carried out. It would also provide a preliminary conceptual model of the site that would serve as the basis for model development.

5.6.4 Technical Memoranda

5.6.4.1 Results of Southern Field Investigation

A Technical Memorandum will be prepared at the conclusion of the Southern field investigation. The primary objectives of this technical memorandum are to: summarize the data collected during the investigation, develop a detailed site conceptual model, identify data gaps, and identify potential contaminant source areas or facilities. In addition, this technical memorandum will provide recommendations for the Northern field investigation, including the following:

- Final location and placement of overburden/multiport monitoring wells north of Rio Guanajibo
- Additional source area soil sampling (if needed)
- Locations for groundwater/surface water interaction evaluation
- Locations for surface water and sediment samples
- Recommendations for a potential aquifer test

5.6.4.2 Data Evaluation Summary Report

CDM will present an evaluation of RI results in a Data Evaluation Summary Report for review and approval by EPA. This report will discuss the results of the analyses described under Subtask 4.3 above. The report will provide a summary of the

Northern field investigation components performed and the entire RI data including figures and data tables and will present the approach to full evaluation of the data in the RI report. If additional analytical data are needed or if significant data problems are identified during the evaluation, CDM will provide a separate memorandum describing these problems to EPA for review.

5.7 Task 7 - Risk Assessment

CDM will conduct a baseline HHRA and a SLERA for the San German site. The objectives of the risk assessments are to provide an evaluation of potential threats to human health and the environment that could occur from exposure to contaminants originating from the site in the absence of any remedial action. The risk assessments also provide the basis for determining whether or not remedial action is necessary and the justification for performing remedial actions.

5.7.1 Baseline Human Health Risk Assessment

The baseline HHRA will be performed in accordance with EPA guidance set forth in the following documents:

- *Risk Assessment Guidance for Superfund: Human Health Evaluation Manual, Part A* (EPA 1989a)
- *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments* (EPA 2001a)
- *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment* (EPA 2001c)
- *Exposure Factors Handbook, Vol I, II and III* (EPA 1997a)
- *Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors* (EPA 1991b)
- *Integrated Risk Information System* (IRIS) (EPA on-line data base of toxicity values http://www.epa.gov/iris) (EPA 2005)
- *EPA Regional Screening Levels* (EPA 2008)
- *ProUCL Version 4.0 User's Guide* (EPA 2007b)
- *Evaluating the Vapor Intrusion into Indoor Air* (EPA 2002)

Additional guidance which addresses site-specific issues and chemical contaminants will also be consulted with EPA Region 2.

CDM will prepare a HHRA report that establishes the site characteristics of the contaminated media, extent of contamination, and the physical boundaries of the contamination. CDM will evaluate key contaminants identified in the HHRA for receptor exposure and perform an estimate of the level of key contaminants reaching human receptors. CDM will perform the following activities under this subtask, which will form the basis for the HHRA.

5.7.1.1 Draft Human Health Risk Assessment Report

The draft baseline HHRA report will be submitted after EPA has approved he PAR, described in Section 5.1.13. The draft report will cover the following components:

Hazard Identification

CDM will review available sample information on the hazardous substances present at the site, and identify the COPCs. The selection of COPCs to be used in the risk assessment will be selected in accordance with EPA Region 2 procedures as presented in RAGS Part A. Additional selection criteria that will be used to identify the COPCs at the site include the following:

- Frequency of detection in analyzed medium (e.g., surface soil)
- Historical site information/activities
- Chemical toxicity (weight-of-evidence for potential carcinogenicity)
- Risk-based concentration screen using EPA Regional Screening Levels (EPA 2008) concentrations and media-specific chemical concentrations (i.e., maximum concentrations)

Calcium, magnesium, potassium, and sodium are not selected as COPCs in the risk assessment, since they are considered essential nutrients. ProUCL Verison 4.0 (EPA 2007b) will be utilized to calculate 95% upper confidence levels (UCLs) for selections of EPCs.

Toxicity Assessment

The toxicity assessment will present the general toxicological properties of the selected COPCs using the most current toxicological human health effects data. Those chemicals which cannot be quantitatively evaluated due to a lack of toxicity factors will not be eliminated as COPCs on this basis. These chemicals will be qualitatively addressed for consideration in risk management decisions for the site.

Chemical toxicity values used will be obtained from a variety of toxicological sources according to a hierarchy established in the OSWER Directive 9285.7-53 (EPA 2003). The toxicity values hierarchy is as follows:

- Tier 1 – EPA's IRIS
- Tier 2 – EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs): The Office of Research and Development/National Center for Environmental Assessment (NCEA)/Superfund Health Risk Technical Support Center develop PPRTVs on a chemical-specific basis when requested by EPA's Superfund program
- Tier 3 - Other Toxicity Values: Tier 3 includes additional EPA and non-EPA sources of toxicity information. Priority will be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer-reviewed

Toxicity values include slope factor and reference dose (RfD) or reference concentration (RfC). A slope factor is a plausible upper-bound estimate of the probability of a response per unit intake of a chemical over a lifetime and is usually the upper 95 percent confidence limit of the slope of the dose-response curve expressed in $(mg/kg/day)^{-1}$. A slope factor is used to estimate an upper-bound probability of an individual developing cancer as a result of a lifetime of exposure to a particular level of a potential carcinogen.

For the evaluation of non-carcinogenic effects in the risk assessment, chronic and subchronic RfDs or RfCs are used. A chronic RfD/RfC is an estimate of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without appreciable risk of deleterious effects during a lifetime. Chronic RfDs/RfCs are generally used to evaluate the potential non-carcinogenic health effects associated with exposure periods between six years and a lifetime. Subchronic RfDs/RfCs aid in the characterization of potential non-cancer effects associated with shorter-term exposure (i.e., less than six years).

Toxicity endpoints/target organs for non-carcinogenic COPCs will be presented for those chemicals showing hazard quotients (HQs) greater than unity (one). If the hazard index (HI) is greater than unity (one) due to the summing of HQs, segregation of the HI by affected organs and mechanism of action will be performed as appropriate.

Characterization of Site and Potential Receptors
CDM will identify and characterize human population receptors that may be exposed to site contaminants in various environmental media.

Exposure Assessment
Exposure assessment involves the identification of the potential human exposure pathways at the site for current and potential future land-use scenarios. Potential release and transport mechanisms will be identified for contaminated source media. Exposure pathways will be identified that link the sources, types of environmental releases, and environmental fate with receptor locations and activity patterns. Generally, an exposure pathway is considered complete if it consists of the following elements:

- A source and mechanism of release
- A transport medium
- An exposure point (i.e., point of potential contact with a contaminated medium)
- An exposure route (e.g., ingestion) at the exposure point

All current and future land-use scenario exposure pathways considered will be presented; however, only some may be selected for quantitative analysis. Justifications will be provided for those exposure pathways retained and for those eliminated. The potentially complete exposure pathways and potential receptors are listed below.

- Current Land-use Scenario
  - On-Site Workers (Adults)
    - Surface Soil
      - incidental ingestion
      - dermal contact
      - Inhalation of fugitive dust

  - Recreational Users at Rio Guanajibo (Adult and Adolescent [12-18 years old])

- Sediment
  - Incidental ingestion
  - Dermal contact
- Surface water
  - Incidental ingestion
  - Dermal contact

- Future Land-use Scenario
  - Residents (Adult and Child [0-6 years old])
    - Surface Soil
      - Incidental ingestion
      - Dermal contact
      - Inhalation of fugitive dust
    - Groundwater
      - Ingestion
      - Dermal contact
    - Air
      - Inhalation of volatiles

  - Construction Worker (Adult)
    - Surface and Subsurface Soil
      - incidental ingestion
      - dermal contact
      - inhalation of fugitive dust

  - On-site Workers (Adult)
    - Surface Soil
      - incidental ingestion
      - dermal contact
      - inhalation of fugitive dust

  - Recreational Users at Rio Guanajibo (Adult and Adolescent [12-18 years old])
    - Sediment
      - Incidental ingestion
      - Dermal contact
    - Surface water
      - Incidental ingestion
      - Dermal contact

Exposure point concentrations will be selected for each COPC in the risk assessment for use in the calculation of daily intakes. The concentration is the 95 percent UCL on the arithmetic mean, or the maximum detected value (whichever is lower). ProUCL version 4.0 (EPA 2007b) will be used to calculated 95 percent UCL.

Daily intakes will be calculated for all exposures. These daily intakes will be used in conjunction with toxicity values to provide quantitative estimates of carcinogenic risk and non-cancer effects.

Exposure assumptions used in daily intake calculations will be based on information contained in EPA guidance, site-specific information, and professional judgment. These assumptions are generally 90th and 95th percentile parameters, which represent the reasonable maximum exposure (RME). The RME is the highest exposure that is reasonably expected to occur at a site. If potential risks and hazards exceed EPA target levels then central tendency exposures (CTE) will be evaluated using 50th percentile exposure parameters.

The exposure assessment will identify the magnitude of actual or potential human exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The assumptions will include information from the *Standard Default Assumptions Guidance* (EPA 1991a) and the *Exposure Factors Handbook* (EPA 1997a). Site specific information will be used where appropriate to verify or refine these assumptions. In developing the exposure assessment, CDM will develop reasonable maximum estimates of exposure for both current land use conditions and potential future land use conditions at the site.

Risk Characterization
In this section of the risk assessment, toxicity and exposure assessments will be integrated into quantitative and qualitative expressions of carcinogenic risk and non-carcinogenic health hazards. The estimates of risk and hazard will be presented numerically in spreadsheets contained in an appendix.

Carcinogenic risks are estimated as the incremental probability of an individual developing cancer over a life time as a result of exposure to a potential carcinogen. Per RAGS, the slope factor converts estimated daily intakes averaged over a lifetime directly to incremental risk of an individual developing cancer. This carcinogenic risk estimate is generally an upper-bound value since the slope factor is often an upper 95th percentile confidence limit of probability of response based on experimental animal data used in the multistage model.

The potential for non-carcinogenic effects will be evaluated by comparing an exposure level over a specified time period with a reference dose derived for a similar exposure period. This ratio of exposure to toxicity is referred to as a HQ. This HQ assumes that there is a level of exposure below which it is unlikely even for sensitive populations to experience adverse health effects; however, this value should not be interpreted as a probability. Generally, the greater the hazard quotient is above unity, the greater the level of concern.

Cancer risks and non-carcinogenic HI values will be combined across chemicals and exposure pathways as appropriate. In general, EPA recommends a target value or risk range (i.e., HI = 1 for non-carcinogenic effects or cancer risk = 1×10^{-6} to 1×10^{-4}) as threshold values for potential human health impacts. The results presented in the spreadsheet calculations will be compared to these target levels and discussed.

Characterization of the potential risks associated with the site provides the EPA risk manager with a basis for determining whether additional response action is necessary at the site and a basis for determining residual chemical levels that are adequately protective of human health.

Identification of Uncertainties

In any risk assessment, estimates of potential carcinogenic risks and non-carcinogenic health hazard have numerous associated uncertainties. The primary areas of uncertainty are associated with every step of a risk assessment (data evaluation, exposure assessment, toxicity assessment, and risk characterization). Uncertainties in these steps, specifically, in environmental data, exposure parameter assumptions, toxicological data, and risk characterization will be discussed qualitatively in the report.

CDM SM will coordinate with the EPA RPM and submit draft/interim deliverables as outlined in the RAGS - Part D (EPA 2001a). All data will be presented in RAGS Part D Format. The draft HHRA report will provide adequate details of the activities and be presented so that individuals not familiar with risk assessment can easily follow the procedures.

5.7.1.2 Final Human Health Risk Assessment

CDM will submit the final HHRA report, incorporating EPA review comments.

5.7.2 Screening Level Ecological Risk Assessment

The ecological risk assessment will be prepared in accordance with the *Interim Final Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (ERAGS) (EPA 1997c). The ecological risk assessment begins with a SLERA, which includes Steps 1 and 2 of the ERAGS guidance and is described in the next subsection.

Further ecological risk assessment may be required, depending upon the results of the SLERA and associated EPA management decisions. If the results of the SLERA indicate that the potential for adverse effects exists, a step 3A will be performed to refine the COPCs using lesser conservative approach than those used in the SLERA to evaluate the same data set in the SLERA. EPA will be consulted prior to performing Step 3A. If the results of Step 3A indicate that the potential for adverse effects still exits, the baseline ecological risk assessment may be conducted, beginning with Step 3 of ERAGS.

5.7.2.1 Draft Screening Level Ecological Risk Assessment

A screening level ecological risk assessment will be conducted utilizing the data generated from the RI to evaluate potential risks to ecological receptors from site contaminants in soils, sediments, and surface water within the vicinity of the site potential source areas.

A four-step process is utilized for assessing site-related ecological risks for a reasonable maximum exposure scenario. The screening ecological risk assessment is composed of these four components as listed in order:

- Problem Formulation

- Exposure Assessment
- Effects Assessment
- Risk Characterization

These four components are discussed in details below.

Problem Formulation
The problem formulation section will contain overviews of the environmental setting, nature and extent of contamination, potential sources of contaminations, the initial tier of assessment endpoints selected for the SLERA, and the potential exposure pathways, and the process for identification of COPCs. The environmental setting will include site description, site history, site geology and hydrogeology, habitat and biota, and threatened, endangered species/sensitive environments.

Exposure Assessment
The purpose of the exposure assessment section is to evaluate the potential for receptor exposure to contaminants at the San German site. This evaluation involves identification of contaminant exposure pathways that may be of concern for ecological receptors and determination of the magnitude of exposure to the selected ecological receptors. CDM will consult EPA prior to selecting the receptor species.

Effects Assessment
The effects assessment will link potential contaminant exposure point concentrations to adverse effects in the selected ecological receptors. The goal of the effects assessment is to allow for the determination of the adverse effects of site-related COPCs on selected receptors.

Benchmark toxicity values will be sought and utilized in this assessment. A database search will be performed to identify benchmark toxicity values for COPCs. Data sources will be reviewed and may include:

- Surface Soil
  - EPA Ecological Soil Screening Levels
  - Preliminary Remediation Goals for Ecological Endpoints (Efroymson *et al.* 1997)
- Surface Water
  - Puerto Rico Surface Water Quality Standards (1990)
  - National Recommended Water Quality Criteria (EPA 2006b)
  - National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference tables (1998)
- Sediment
  - Guidelines for Protection and Management of Aquatic Sediment Quality in Ontario – LEL and SEL (Ontario August 1993)
  - NOAA Screening Quick Reference Tables (1998)
  - MacDonald *et al.* 2000 Consensus-Based Threshold Effect

Chemicals will not be eliminated as COPCs due to the chemical's frequency of detection or by comparison to background concentrations.

Risk Characterization

Risk characterization will evaluate the evidence linking site contamination with adverse ecological effects. Risk characterization will integrate the exposure assessment with the toxicity assessment. Characterization of risk to site ecological receptors will be determined on the basis of comparison of maximum detected concentration with benchmark values from the literature with exposure doses (HQ approach).

Uncertainties

In producing any risk assessment, it is necessary to make assumptions. Assumptions carry with them associated uncertainties which will be identified so that risk estimates can be put into perspective. Uncertainties associated with the ecological risk assessment will be discussed.

SLERA Recommendations

Upon completion of a SLERA, a scientific management decision point (SMDP) will be made with a determination of the following:

- Ecological threats are negligible.
- The ecological risk assessment should continue to determine whether a risk exists.
- There is potential for adverse ecological effects and a more detailed ecological risk assessment, incorporating more site-specific information is needed.

If results of the SLERA for the San German site indicate that potential for ecological adverse effects exists, CDM will recommend perform Step 3A to evaluate the same data set in the SLERA using lesser conservative approach to refine the selection of COPCs. Subsequently, EPA will make a SMDP whether Step 3A should be conducted.

The approach for conducting Step 3A includes the following:

- Refinement of exposure point concentrations
- Normalization of surface water screening values using average site-specific hardness concentrations
- Normalization of sediment screening values using average site-specific total organic carbon concentrations
- Consideration of background concentrations and contaminant detection frequencies
- Refinement of screening benchmarks

If the results of this Step 3A indicate that the potential for adverse effects still exits, EPA will determine whether a baseline ecological risk assessment is warranted.

5.7.2.2 Final Screening Level Ecological Risk Assessment Report

CDM will submit the final SLERA report to EPA, incorporating EPA's review comments.

If the SLERA indicates the need for additional ecological investigation, and EPA agrees with the recommendation, a work plan letter will be prepared under Subtask 5.7.2.2. The work plan letter will outline the technical requirements to conduct further ecological investigations at the site and the associated costs for the work.

5.8 Task 8 - Treatability Study/Pilot Testing

Applicable treatment technologies that may be suitable for the San German site will be identified to determine if there is a need to conduct treatability studies.

5.8.1 Literature Search

CDM will research viable technologies that may be applicable to the contaminants of concern and the site conditions encountered. Upon completion of the literature search, CDM will provide a technical memorandum to the EPA RPM that summarizes the results. As part of this document, CDM will submit a plan that recommends performance of a treatability study and identifies the types and specific goals of the study. The treatability study will be designed to determine the suitability of remedial technologies to site conditions and addressing the type of contamination that exists at the site. If directed by EPA, CDM will prepare an addendum to the RI/FS work plan for the treatability study. An addendum for a treatability study is not included in the current work plan.

5.8.2 Treatability Study Work Plan (Optional)

If requested by the EPA, CDM will perform the following:

- Prepare a draft addendum to the RI/FS work plan that describes the approach for performance of the treatability study
- Participate in negotiations to discuss the final technical approach and costs required to accomplish the treatability study requirements
- Prepare a final work plan addendum and supplemental budget that incorporates the agreements reached during the negotiations

The treatability study work plan addendum will describe the treatment process and how the proposed technology or vendor (if proprietary) will meet the performance standards for the site. The work plan addendum will address how the proposed technology or vendor will meet all discharge or disposal requirements for treated material, air, water, and expected effluents. The proposed treatment and disposal of all material generated during the treatability study will be addressed.

The treatability study work plan addendum will describe the technology to be tested, test objectives, test equipment or systems, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, H&S procedures, and residual waste management. The DQOs for the treatability study will also be documented. If pilot-scale treatability studies are to be done, the treatability study work plan addendum will also describe pilot plant installation and startup, pilot plant operation and maintenance procedures, and operating conditions to be tested. If testing is to be performed off-site, permitting requirements will be addressed. A schedule for performing the treatability study will be included with specific durations and dates, when available, for each task and subtask, including anticipated EPA review periods. The schedule will also include key milestones for which completion dates should be specified. Such milestones are procurement of subcontractors, sample collection, sample analysis and preparation of the treatability study report.

5.8.3 Conduct Treatability Studies (Optional)

CDM will conduct the treatability study in accordance with the approved treatability study addendum to the RI/FS work plan, QAPP, and HSP, to determine whether the remediation technology or vendor of the technology can achieve the performance standards.

The following activities are to be performed, when applicable, as part of the performance of the treatability study and pilot testing:

- Procurement of Test Facility and Equipment - CDM will procure the test facility and equipment necessary to execute the tests.
- Procurement of Subcontractors - CDM will procure subcontractors as necessary for test/study performance.
- Test and Operate Equipment - CDM will test the equipment to ensure proper operation, and operate or oversee operation of the equipment during the testing.
- Retrieve Samples for Testing - CDM will obtain samples for testing as specified in the treatability study work plan.
- Perform Laboratory Analysis - CDM will establish a field laboratory to facilitate fast-turnaround analysis of test samples, if economically and technically feasible.
- Characterize and dispose of residual wastes.
- Evaluate the test results.

5.8.4 Treatability Study Report (Optional)

CDM will prepare and submit the treatability study evaluation report that describes the performance of the technology. The study results will clearly indicate the performance of the technology or vendor compared with the performance standards established for the site. The report will also evaluate the treatment technology's effectiveness, implementability, cost and final results compared with the predicted results. In addition, the report will evaluate full-scale application of the technology, including a sensitivity analysis that identifies the key parameters affecting full-scale operation.

5.9 Task 9 - Remedial Investigation Report

CDM will develop and submit a remedial investigation report that accurately establishes site characteristics including the identification of contaminated media, definition of the extent of contamination in groundwater, soils, surface water, and sediments and delineation of the physical boundaries of contamination. CDM will obtain detailed sampling data to identify key contaminants and determine the movement and extent of contamination in the environment. Key contaminants will be identified in the report and will be selected based on toxicity, persistence, and mobility in the environment.

5.9.1 Draft Remedial Investigation Report

A draft RI report will be prepared in accordance with the format described in EPA guidance documents such as the *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA 1988). A draft outline of the report, adapted from the guidance document, is shown in Table 5-4. This outline should be considered a draft and subject to revision, based on the data obtained. EPA's SOW for this work assignment has provided a detailed description of the types of information, maps, and figures to be included in the RI report. CDM will incorporate such information to the fullest extent practicable.

Upon completion, the draft RI report will be submitted for review by a CDM Technical Review Committee (TRC), followed by a QA review. It will then be submitted to EPA for formal review and comment.

5.9.2 Final Remedial Investigation Report

Upon receipt of all EPA and other federal and Commonwealth written comments, CDM will develop responses to comments, and revise the report prior to submittal to EPA. When EPA determines that the report is acceptable, the report will be deemed the final RI report.

5.10 Task 10 - Remedial Alternatives Screening

This task covers activities for the development of appropriate remedial alternatives that will undergo full evaluation. A range of alternatives will be considered, including innovative treatment technologies, consistent with the regulations outlined in the NCP, 40 CFR Part 300, the *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (OSWER Directive 9355.3-01 October 1988 or latest version), and other OSWER directives including 9355.4-03, October 18, 1989, and 9283.1-06, May 27, 1992, *Considerations in Ground Water Remediation at Superfund Sites* (1992c), as well as other applicable and more recent policies or guidance. CDM will also use EPA's 1996 final guidance *Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Groundwater at CERCLA Sites*, which describes strategies and technologies for groundwater contaminated with chlorinated solvents.

CDM will investigate alternatives that will remediate or control contaminated media related to the site, as defined in the RI, to provide adequate protection of human health and the environment. The potential alternatives will encompass, as appropriate, a range of alternatives in which treatment is used to reduce the toxicity, mobility, or volume of wastes but vary in the degree to which long-term management of residuals or untreated waste is required, and will include one or more alternatives involving containment with little or no treatment, as well as a no-action alternative.

Based on EPA's presumptive remedy guidance (1996), the following alternatives, composed of treatment technologies for potentially affected media at the site, may be selected as representative technologies in the FS alternatives if they are deemed appropriate for chlorinated VOCs:

Groundwater

- No Action
- Groundwater treatment with air stripping, granular activated carbon, chemical/ultraviolet oxidation, permeable reactive barriers, and/or anaerobic biological reactors
- Monitored natural attenuation

Additional technologies may be evaluated if extremely high levels of contamination (e.g., DNAPL) are identified. Groundwater remedial alternatives will also include several disposal options for treated groundwater (e.g., recharge basins, discharge to a surface water body).

Based on the established remedial response objectives and the results of the risk assessments (Task 7), the initial screening of remedial alternatives will be performed according to the procedures recommended in *Interim Final Guidance for Conducting RI/FS under CERCLA* (EPA 1988).

The alternatives will be screened qualitatively against three criteria: effectiveness, implementability, and relative cost. A brief description of the application of these criteria is as follows:

- <u>Effectiveness</u> - The evaluation focuses on the potential effectiveness of technologies in meeting the remedial action goals; the potential impacts to human health and the environment during construction and implementation; and how proven and reliable the process is with respect to the contaminants and conditions at the site.

- <u>Implementability</u> - This evaluation encompasses both the technical and administrative feasibility of the technology. It includes an evaluation of treatment requirements, waste management, and relative ease or difficulty in achieving the operation and maintenance requirements. Technologies that are clearly unworkable at the site are eliminated.

- <u>Relative Cost</u> - Both capital cost and operation and maintenance cost are considered. The cost analysis is based upon engineering judgement, and each technology is evaluated as to whether costs are high, moderate, or low relative to other options within the same category.

The screening evaluation will generally focus on the effectiveness criterion, with less emphasis on the implementability and relative cost criteria. Technologies surviving the screening process are those that are expected to achieve the remedial action objectives for the site, either alone or in combination with others.

5.10.1 Technical Memorandum

CDM will prepare a draft remedial alternatives screening memorandum that will document all of the analyses and evaluations described above. This draft memorandum will be submitted to EPA for formal review and comment and will:

- Establish Remedial Action Objectives - Based on existing information, CDM will identify site-specific remedial action objectives that should be developed to protect human health and the environment. The objectives will specify the contaminant(s) and media of concern, the exposure route(s) and receptor(s), and an acceptable contaminant level or range of levels for each exposure route (i.e., preliminary remediation goals).
- Establish General Response Actions - CDM will develop general response actions for each medium of interest by defining contaminant, treatment, excavation, pumping, or other actions, singly or in combination to satisfy remedial action objectives. The response actions will take into account requirements for protectiveness as identified in the remedial action objectives and the chemical and physical characteristics of the site.
- Identify and Screen Applicable Remedial Technologies - CDM will identify and screen technologies based on the general response actions. Hazardous waste treatment technologies will be identified and screened to ensure that only those technologies applicable to the contaminants present, their physical matrix, and other site characteristics will be considered. This screening will be based primarily on a technology's ability to address the contaminants at the site effectively, but will also take into account that technology's implementability and cost. CDM will select representative process options, as appropriate, to carry forward into alternative development and will identify the need for treatability testing for those technologies that are probable candidates for consideration during the detailed analysis.
- Develop Remedial Alternatives in accordance with the NCP.
    - Screen Remedial Alternatives for Effectiveness, lmplementability, and Cost - CDM will screen alternatives to identify the potential technologies or process options that will be combined into media-specific or site-wide alternatives. The developed alternatives will be defined with respect to size and configuration of the representative process options, time for remediation, rates of flow or treatment, spatial requirements, distances for disposal, required permits, imposed limitations, and other factors necessary to evaluate the alternatives. If many distinct viable options are available and developed, CDM will screen the alternatives undergoing detailed analysis to provide the most promising process options.

The technical evaluations completed as part of this task will be summarized and presented to EPA in a technical meeting.

5.10.2 Final Technical Memorandum

As directed by EPA, this subtask is not applicable. EPA's review comments on the draft technical memorandum will be incorporated into the draft FS report under Section 5.12.1.

5.11 Task 11 - Remedial Alternatives Evaluation

Remedial technologies passing the initial screening process will be grouped into remedial alternatives. This task covers efforts associated with the assessment of individual alternatives against each of the nine current evaluation criteria and a comparative analysis of all options against the evaluation criteria. The analysis will be consistent with the NCP, 40 CFR Part 300, and will consider the *Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA* (OSWER Directive 9355.3-01) and other pertinent OSWER guidance. The detailed evaluation criteria for remedial alternatives are listed on Table 5-4 and a brief description of each criterion is provided below.

- <u>Overall Protection of Human Health and the Environment</u> - This criterion provides a final check to assess whether each alternative meets the requirement that it is protective of human health and the environment. The overall assessment of protection is based on a composite of factors assessed under the evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.
- <u>Compliance with ARARs</u> - This criterion is used to determine how each alternative complies with applicable or relevant and appropriate Federal and State requirements, as defined in Section 121 of CERCLA 42 USC Section 9621.
- <u>Long-Term Effectiveness</u> - This criterion addresses the results of a remedial action in terms of the risk remaining at the site after the response objectives have been met. The primary focus of this evaluation is to determine the extent and effectiveness of the controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes. The factors to be evaluated include the magnitude of remaining risk (measured by numerical standards such as cancer risk levels), and the adequacy, suitability and long-term reliability of management controls for providing continued protection from residuals (i.e., assessment of potential failure of the technical components).
- <u>Reduction of Toxicity, Mobility, or Volume</u> - This criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility or volume of the contaminants. The factors to be evaluated include the treatment process employed, the amount of hazardous material destroyed or treated, the degree of reduction expected in toxicity, mobility or volume, and the type and quantity of treatment residuals.
- <u>Short-Term Effectiveness</u> - This criterion addresses the effects of the alternative during the construction and implementation phase until the remedial actions have been completed and the selected level of protection has been achieved. Each alternative is evaluated with respect to its effects on the community and onsite

workers during the remedial action, environmental impacts resulting from implementation, and the amount of time until protection is achieved.

- Implementability - This criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation. Technical feasibility considers construction and operational difficulties, reliability, ease of undertaking additional remedial action (if required), and the ability to monitor its effectiveness. Administrative feasibility considers activities needed to coordinate with other agencies (e.g., Commonwealth and local) in regard to obtaining permits or approvals for implementing remedial actions.
- Cost - This criterion addresses the capital costs, annual operation and maintenance costs, and present worth analysis. Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs. Direct costs include expenditures for the equipment, labor and material necessary to perform remedial actions. Indirect costs include expenditures for engineering, financial and other services that are not part of actual installation activities but are required to complete the installation of remedial alternatives. Annual operation and maintenance costs are post-construction costs necessary to ensure the continued effectiveness of a remedial action. These costs will be estimated to provide an accuracy of +50 percent to -30 percent. A present worth analysis is used to evaluate expenditures that occur over different time periods by discounting all future costs to a common base year, usually the current year. This allows the cost of remedial action alternatives to be compared on the basis of a single figure representing the amount of money that would be sufficient to cover all costs associated with the remedial action over its planned life.
- Commonwealth Acceptance - This criterion evaluates the technical and administrative issues and concerns the Commonwealth may have regarding each of the alternatives. The factors to be evaluated include those features of alternatives that the Commonwealth supports, reservations of the Commonwealth, and opposition of the Commonwealth.
- Community Acceptance - This criterion incorporates public concerns into the evaluation of the remedial alternatives. Often, community (and also Commonwealth) acceptance cannot be determined during development of the RI/FS. Evaluation of these criteria is postponed until the RI/FS report has been released for state and public review. These criteria are then addressed in the ROD and the responsiveness summary.

Each remedial alternative will be subject to a detailed analysis according to the above evaluation criteria. A comparative analysis of all alternatives will then be performed to evaluate the relative benefits and drawbacks of each according to the same criteria. A preferred remedial alternative will be recommended based upon the results of the comparative analysis.

5.11.1 Technical Memorandum

CDM will prepare a draft technical memorandum that addresses the following:

- A technical description of each alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative.
- A discussion that describes the performance of that alternative with respect to each of the evaluation criteria. A table will be provided summarizing the results of this analysis. Once the individual analysis is completed, a comparison and contrast of the alternatives to one another, with respect to each of the evaluation criteria, will be performed.

This draft memorandum will be submitted to EPA for formal review and comment. In addition, the technical evaluations completed as part of this task will be summarized and presented to EPA in a technical meeting.

5.11.2 Final Technical Memorandum

As directed by EPA, this subtask is not applicable. EPA's review comments on the draft technical memorandum will be incorporated into the draft FS report under Section 5.12.1.

5.12 Task 12 - Feasibility Study Report

CDM will develop a feasibility study report consisting of a detailed analysis of alternatives and a cost-effectiveness analysis, in accordance with the NCP, 40 CFR Part 300, as well as the most recent guidance.

5.12.1 Draft Feasibility Study Report

CDM will submit a draft feasibility study report to EPA that includes the following detailed information.

- Summarize the RI - CDM will summarize key elements of the RI including the nature and extent of contamination in all site media of concern, the fate and transport factors that affect the identified contamination, and the results of the site risk assessments.
- Establish Remedial Action Objectives - Based on existing information, CDM will identify site-specific remedial action objectives that will protect human health and the environment. The objectives will specify the contaminant(s) and media of concern, the exposure route(s) and receptor(s), and an acceptable contaminant level or range of levels for each exposure route (i.e., preliminary remediation goals).
- Establish General Response Actions - CDM will develop general response actions for each medium of interest by defining contaminant, treatment, excavation, pumping, or other actions, singly or in combination, to satisfy remedial action objectives. The response actions will take into account requirements for protectiveness as identified in the remedial action objectives and the chemical and physical characteristics of the site.
- Identify and Screen Applicable Remedial Technologies - CDM will identify and screen technologies based on the general response actions. Hazardous waste treatment technologies will be identified and screened to ensure that only those technologies applicable to the contaminants present, their physical matrix, and

other site characteristics will be considered. This screening will be based primarily on a technology's ability to address the contaminants at the site effectively, but will also take into account that technology's implementability and cost. If applicable, CDM will develop an analytical flow model to support groundwater flow and plume capture model of the hydrogeologic system at the site and surrounding area. CDM will select representative process options, as appropriate, to carry forward into alternative development and will identify the need for treatability testing for those technologies that are probable candidates for consideration during the detailed analysis.

- Develop Remedial Alternatives in accordance with the NCP - CDM will assemble technologies into remedial alternatives to address the identified contamination at the site.
- Screen Remedial Alternatives for Effectiveness, implementability, and Cost - CDM will screen alternatives to identify the potential technologies or process options that will be combined into media-specific or site-wide alternatives. The developed alternatives will be defined with respect to size and configuration of the representative process options, time for remediation, rates of flow or treatment, spatial requirements, distances for disposal, required permits, imposed limitations, and other factors necessary to evaluate the alternatives. If many distinct viable options are available and developed, CDM will screen the alternatives undergoing detailed analysis to focus on the most promising process options.
- Develop Detailed Alternative Descriptions - CDM will develop detailed technical descriptions of each alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative.
- Screen Against Evaluation Criteria - CDM will present discussions that describe the performance of each alternative with respect to the evaluation criteria described in Section 5.11. The results of the analysis will be summarized in a table.
- Compare Alternatives - CDM will compare and contrast the alternatives to one another, with respect to each of the evaluation criteria.

The technical feasibility considerations will include the careful study of any problems that may prevent a remedial alternative from mitigating site problems. Therefore, the site characteristics from the RI will be kept in mind as the technical feasibility of the alternative is studied. Specific items to be addressed will be reliability (operation over time), safety, operation and maintenance, ease with which the alternative can be implemented, and time needed for implementation.

The FS report format is shown on Table 5-6 and will consist of an executive summary and five sections. The executive summary will be a brief overview of the FS and the analysis underlying the remedial actions that were evaluated. The five sections will be as follows:

- Introduction and Summary of the Remedial Investigation
- Identification and Screening of Remedial Technologies
- Development and Initial Screening of Remedial Alternatives

- Description and Detailed Analysis of Alternatives
- Comparative Analysis of Alternatives

The FS report will be reviewed by a CDM TRC. TRC comments will be addressed prior to submittal to EPA for review.

5.12.2 Final Feasibility Study Report

Upon receipt of all EPA and other federal and Commonwealth written comments, CDM will prepare a response to comments letter prior to revising the FS report for submittal to EPA. When EPA determines that the document is acceptable, the FS report will be deemed the final FS report.

5.13 Task 13 Post RI/FS Support

CDM will provide technical support required for the preparation of the ROD, excluding community relations activities already addressed under Task 2. CDM's support activities will include the following:

- Attendance at public meetings, briefings, and technical meetings to provide site updates
- Review of presentation materials
- Technical support for preparation of draft and final Responsiveness Summary, Proposed Plan, and Record of Decision
- Preparation and review of a draft and final Feasibility Study addendum (if required), based on the final ROD adopted for this site, covering issues arising after finalization of the basic RI/FS documents

5.14 Task 14 Administrative Record

In accordance with the SOW, this task is currently not applicable to this work assignment.

5.15 Task 15 Close-out

Project closeout includes work efforts related to the project completion and closeout phase. Project records will be transferred to EPA. A Work Assignment Closeout Report (WACR) will be completed.

5.15.1 Work Assignment Closeout Report

CDM will prepare a WACR that will include all level-of-effort hours, by professional level, and costs in accordance with the project work breakdown structure.

5.15.2 Document Indexing

CDM will organize the work assignment files in its possession in accordance with the currently approved file index structure.

5.15.3 Document Retention/Conversion

CDM will convert all pertinent paper files into an appropriate long-term storage format. EPA will define the specific long-term storage format prior to closeout of this work assignment.

Section 6
Schedule

A project schedule for the entire RI/FS scope (including both Southern and Northern Investigations) is included as Figure 6-1. The project schedule is based on assumptions for durations and conditions of key events occurring on the critical and non-critical path. These assumptions are as follows:

- All components of the Northern Investigation are requested to be performed
- The schedule for the field activities is dependent on access to all properties being obtained by EPA without difficulty.
- Field activities will not be significantly delayed due to severe weather conditions (i.e., hurricanes).
- The schedule for the field activities is dependent on timely review and approval of the work plan and QAPP and the provision of adequate funding by EPA.
- The schedule for the field investigation is dependent on all field activities being performed in Level D or Level C personal protective equipment (PPE) H&S protection.

CDM will receive validated data for analyses performed by EPA's CLP eight weeks after sample collection.

Section 7
Project Management Approach

7.1 Organization and Approach

The SM, Mr. Brendan MacDonald, P.E., has primary responsibility for plan development and implementation of the RI, including coordination with the RI task manager and support staff, development of bid packages for subcontractor services, acquisition of engineering or specialized technical support, and all other aspects of the day-to-day activities associated with the project. The SM identifies staff requirements, directs and monitors site progress, ensures implementation of quality procedures and adherence to applicable codes and regulations, and is responsible for performance within the established budget and schedule.

The RITM, Mr. Michael Valentino, PG, reports to, and will work directly with the SM to develop and coordinate the work plan, QAPP, staffing and physical resource requirements, and technical statements of work for professional subcontractor services. He will be responsible for the implementation of the field investigation, performance tracking of the CDM subcontractor laboratory, the analysis, interpretation and presentation of data acquired relative to the site, preparation of the data evaluation summary report, and the RI report.

The FS task manager (FSTM), Mr. Brendan MacDonald, P.E., will work closely with the RITM task manager to ensure that the field investigation generates the proper type and quantity of data for use in the initial screening of remedial technologies/ alternatives, detailed evaluation of remedial alternatives, development of requirements for and evaluation of treatability study/pilot testing, if required, and associated cost analysis. The FS report will be developed by the FS technical group.

The FTL, Mr. Jose Reyes-Pinol, is responsible for on-site management for the duration of all site operations including the activities conducted by CDM such as equipment mobilization, sampling, and the work performed by subcontractors such as surveying.

The RQAC is Ms. Jeniffer Oxford, who is responsible for overall project quality including development of the QAPP, review of specific task QA/QC procedures, and auditing of specific tasks. The RQAC reports to the CDM Quality Assurance Manager (QAM).

The RAC II QAM, Mr. Doug Updike, is responsible for overall quality for the RAC contract, and will have approved quality assurance coordinators (QACs) perform the required elements of the RAC II QA program of specific task QA/QC procedures, and auditing of specific tasks at established intervals. These QACs report to CDM's corporate QA Manager RAC II and are independent of the SM's reporting structure.

The ASC, Mr. Scott Kirchner, will ensure that the subcontract analytical laboratory will perform analyses as described in the QAPP. The ASC provides assistance with meeting EPA sample management and paperwork requirements.

The task numbering system for the RI/FS effort is described in Section 5 of this work plan. Each of these tasks has been scheduled and will be tracked separately during the course of the RI/FS work. For the RAC II contract, the key elements of the monthly progress report will be submitted within 20 calendar days after the end of each reporting period and will consist of a summary of work completed during that period and associated costs.

Project progress meetings will be held, as needed, to evaluate project status, discuss current items of interest, and review major deliverables such as the work plan, QAPP, the data evaluation summary report, the RI report, the human health risk assessment, the SLERA report, and the FS report.

7.2 Quality Assurance and Document Control

All work by CDM on this work assignment will be performed in accordance with the *CDM QA Manual, Revision 11,* (March 2007).

The RAC II RQAC will maintain QA oversight for the duration of the work assignment. A CDM QAC has reviewed this work plan for QA requirements. A QAPP governing field sampling and analysis is required and will be prepared in accordance with the UFP for QAPP Guidance Manual and current EPA Region 2 guidance and procedures. It will be submitted to an approved QAC for review and approval before submittal to EPA. Any reports for this work assignment which present measurement data generated during the work assignment will include a QA section addressing the quality of the data and its limitations. Such reports are subject to QA review following technical review. Statements of work for subcontractor services and subcontractor bids and proposals will receive technical and QA review.

The CDM SM is responsible for implementing appropriate QC measures on this work assignment. Such QC responsibilities include:

- Implementing the QC requirements referenced or defined in this work plan and in the QAPP
- Adhering to the CDM RAC Management Information System (RACMIS) document control system
- Organizing and maintaining work assignment files
- Conducting field planning meetings, as needed, in accordance with the RAC II QMP
- Completing measurement and test equipment forms that specify equipment requirements

Technical and QA review requirements as stated in the QMP will be followed on this work assignment.

Document control aspects of the program pertain to controlling and filing documents. CDM has developed a program filing system that conforms to EPA's requirements to ensure that the documents are properly stored and filed. This guideline will be implemented to control and file all documents associated with this work assignment.

The system includes document receipt control procedures, a file review, an inspection system, and file security measures.

The RAC II QA program includes both self-assessments and independent assessments as checks on quality of data generated on this work assessment. Self assessments include management system audits, trend analyses, calculation checking, data validation, and technical reviews. Independent assessments include office, field and laboratory audits and the submittal of performance evaluation samples to laboratories if required.

One QA internal system audit and one field technical system audit are required. A laboratory technical system audit may be conducted by a qualified lab auditor. Performance audits (i.e., performance evaluation samples) may be administered by CDM as required for any analytical parameters. An audit report will be prepared and distributed to the audited group, to CDM management, and to EPA. EPA may conduct or arrange a system or performance audit.

7.3 Project Coordination

The SM will coordinate all project activities with the EPA RPM. Regular telephone contact will be maintained to provide updates on project status. Field activities at the site will require coordination among federal, Commonwealth, and local agencies and coordination with involved private organizations. Coordination of activities with these stakeholders is described below.

EPA is responsible for overall direction and approval of all activities for the San German site. EPA may designate technical advisors and experts from academia or its technical support branches to assist on the site. Agency advisors could provide important sources of technical information and review, which the CDM team will use from initiation of RI/FS activities through final reporting.

Sources of technical information include EPA, PREQB, PRASA, PRIDCO, USGS, and sampling conducted during previous investigations. These sources can be used for background information on the site and surrounding areas.

The Commonwealth, through PREQB, may provide review, direction, and input during the RI/FS. EPA's RPM will coordinate contact with personnel from other agencies.

Local agencies that may be involved include PRASA, and local departments such as planning boards, zoning and building commissions, police, fire, health departments, and utilities (water and sewer). Contacts with these local agencies will be coordinated through EPA.

Private organizations requiring coordination during the RI/FS include residents in the area and public interest groups such as environmental organizations and the press. Coordination with these interested parties will be performed through EPA.

Section 8
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Section 9
Acronyms

amsl	above mean sea level
AOC	area of concern
ARARs	Applicable or Relevant and Appropriate Requirements
ASC	Analytical Services Coordinator
AST	aboveground storage tank
Baxter	Baxter Worldwide
bgs	below ground surface
BOA	basic ordering agreement
BTEX	benzene, toluene, ethylbenzene, xylene
CCL	CCL Insertco de PR
CDM	CDM Federal Programs Corporation
CEPD	Caribbean Environmental Protection Division
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
cis-1,2-DCE	*cis*-1,2-dichloroethene
CLASS	Contract Laboratory Analytical Support Services
CLP	Contract Laboratory Program
CO	Contracting Officer
COPC	chemical of potential concern
CRP	Community Relations Plan
CSM	conceptual site model
CTE	Central Tendency Exposure
DEC	Digital Equipment Corporation
DESA	Division of Environmental Science and Assessment
DNAPL	dense non-aqueous phase liquid
DPT	Direct push technology
DQI	Data Quality Indicator
DQO	Data Quality Objective
Eh	Oxidation-Reduction Potential
EI	Environmental Investigation
EPA	United States Environmental Protection Agency
EPC	Exposure point concentration
EQuIS	Environmental Quality Information Systems
ERAGS	Ecological Risk Assessment Guidance for Superfund
ESAT	Environmental Services Assistance Team
ESI	Expanded Site Inspection
F	Fahrenheit
FASTAC	Field and Analytical Services Teaming Advisory Committee
FS	feasibility study
FSTM	feasibility study task manager

FTL	Field Team Leader
ft	feet
GE	Caribe GE Distribution Components, Inc.
GIS	Geographic Information System
GPD	gallon per day
GPS	Global Positioning System
gpm	gallons per minute
H&S	health and safety
HHRA	Human Health Risk Assessment
HI	Hazard Index
HP	Hewlett Packard
HQ	Hazard Quotient
HRS	Hazard Ranking System
HSP	Health and Safety Plan
ID	inner diameter
IDW	Investigation Derived Waste
IFB	Invitation For Bid
IRIS	Integrated Risk Information System
ISB	Information Services Branch
LEL	Lowest effects level
LOAEL	Lowest observed adverse effect level
Lola I	Lola Rodriguez de Tio I well
Lola II	Lola Rodriguez de Tio II well
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDL	Method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No observed adverse effect level
NOV	notice of violation
NPDES	National Pollution Discharge Elimination System
NPL	National Priority List
O&M	operations and maintenance
OSWER	Office of Solid Waste and Emergency Response
OMJ	OMJ Pharmaceutical
PAR	Pathway Analysis Report
PA/SI	Preliminary Assessment/Site Inspection
PCB	PCB facility
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PG	project geologist
PHP	Plastic Home Products
PID	photoionization detector

PLOE	professional level of effort
PO	Project Officer
POTW	Publicly Owned Treatment Works
ppb	parts per billion
PPRTV	Provisional Peer Reviewed Toxicity Values
PRASA	Puerto Rico Aqueduct and Sewer Authority
PRDOH	Puerto Rico Department of Health
PREPA	Puerto Rico Electric Power Authority
PREQB	Puerto Rico Environmental Quality Board
PRG	Preliminary Remediation Goal
PRIDCO	Puerto Rico Industrial Development Corporation
PSA	Potential Source Area
PSO	Program Support Office
PSW	public supply well
QA/QC	quality assurance/quality control
QAC	Quality Assurance Coordinator
QAD	Quality Assurance Director
QAM	Quality Assurance Manager
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
RA	risk assessment
RAC	Response Action Contract
RACMIS	RAC Management Information System
RAGS	Risk Assessment Guidance for Superfund
RAS	Routine Analytical Services
RCRA	Resource Conservation and Recovery Act
RfC	reference concentration
RfD	reference dose
RFP	request for proposal
RIP	Retiro Industrial Park
RITM	remedial investigation task manager
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
RME	reasonable maximum exposure
ROD	Record of Decision
RPM	Remedial Project Manager
RQAC	Regional Quality Assurance Coordinator
RSCC	Regional Sample Control Center
SARA	Superfund Amendments and Reauthorization Act of 1986
SAT	Site Assessment Team
SDI	Site Discovery Initiative
SEL	severe effects limit
SL	screening level
SLERA	Screening Level Ecological Risk Assessment
SM	site manager
SMO	Sample Management Office
SMDP	scientific management decision point
SOP	Standard Operating Procedures

SOW	Statement of Work
SQG	small quantity generator
SQL	sample quantitation limit
SSC	site-specific compound
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TAT	turnaround time
TBC	"To Be Considered"
TCE	trichloroethene
TCL	Target Compound List
TDS	Total dissolved solids
TKN	total Kjehldahl nitrogen
TOC	total organic carbon
TPH	total petroleum hydrocarbon
TRC	Technical Review Committee
TSS	total suspended solids
TSCA	Toxic Substances Control Act
UCL	Upper Confidence Limit
UFP	Uniform Federal Policy
USC	United States Code
USGS	United States Geological Survey
UST	Underground storage tank
VOC	volatile organic compound
WACR	Work Assignment Close-Out Report
µg/kg	micrograms/kilogram
µg/L	micrograms/liter
1,1,1-TCA	1,1,1-tetrachloroethene

Tables

Tables

Table 2-1
Summary of VOC Detections in Public Supply Wells
San German Groundwater Contamination Site
San German, Puerto Rico

Well	Compound	Date	Reported Value (µg/L)	MDL (µg/L)	Party
Lola I	cis-1,2-DCE	26-Apr-01	0.47	not listed	PRASA
		23-Jan-02	0.6	not listed	PRASA
		26-Dec-02	0.5	0.50	PRASA
		23-Oct-03	0.6	0.50	PRASA
		6-Nov-03	0.5	0.50	PRASA
		1-Jun-06	1.5	0.50	EPA
	PCE	26-Apr-01	2.4	0.50	PRASA
		26-Apr-01	2.1	not listed	PRASA
		23-Jan-02	6.4	not listed	PRASA
		23-Jul-02	1.7	not listed	PRASA
		26-Dec-02	4.2	0.50	PRASA
		24-Jan-03	1.3	0.50	PRASA
		5-May-03	1.1	0.50	PRASA
		25-Sep-03	3.4	0.50	PRASA
		23-Oct-03	5.7	0.50	PRASA
		6-Nov-03	3.2	0.50	PRASA
		12-May-04	1.4	0.50	PRASA
		19-Aug-04	2.2	0.50	PRASA
		1-Jun-06	1.6	0.50	EPA
	TCE	1-Jun-06	0.54	0.50	EPA
Lola II	cis-1,2-DCE	29-Jan-02	0.7	not listed	PRASA
	PCE	26-Apr-01	2.5	not listed	PRASA
		26-Apr-01	2.6	0.5	PRASA
		29-Jan-02	6.2	not listed	PRASA
		26-Dec-02	4.2	0.5	PRASA
Retiro	cis-1,2-DCE	29-Jun-03	1.2	0.5	PRASA
	PCE	26-Apr-01	1	0.5	PRASA
		26-Apr-01	0.8	not listed	PRASA
		29-Jul-02	1.4	not listed	PRASA
		26-Dec-02	1	0.5	PRASA
		24-Jan-03	1.1	0.5	PRASA
		29-Jun-03	0.6	0.5	PRASA
		25-Sep-03	0.9	0.5	PRASA
		23-Oct-03	1.4	0.5	PRASA
		12-May-04	1.7	0.5	PRASA
		19-Aug-04	3.1	0.5	PRASA
		4-Dec-04	5	0.5	PRASA
		11-Mar-05	4.1	0.5	PRASA
		16-Mar-05	4	0.5	PRASA
		10-Jul-05	3.6	0.5	PRASA

Abbreviations:

cis-1,2-DCE	cis-1,2-dichloroethylene
EPA	U.S. Environmental Protection Agency
MDL	method detection limit
PCE	tetrachloroethylene
PRASA	Puerto Rico Aqueduct and Sewer Authority
TCE	trichloroethylene
VOC	volatile organice compound
µg/L	micrograms per liter

Table 4-1
Summary of Data Quality Levels
San German Groundwater Contamination Site
San German, Puerto Rico

Data Uses	Analytical Level [1]	Types of Analysis
Site Characterization Monitoring during implementation of field events	Screening level	- Total organic vapor using field instruments - Water quality field measurements using portable instruments
Risk Assessment Site Characterization	Definitive level	- Organics/Inorganics using EPA-approved methods - CLP SOWs - Standard water analyses - Analyses performed by laboratory
Site Characterization	Screening level with definitive level confirmation Field instrument [2]	- Measurements from field equipment - Qualitative measurements

Notes:

(1) Definitions of analytical levels: Screening data are generated by rapid, less precise methods of analysis with less rigorous sample preparation. Screening data provide analyte (or at least chemical class) identification and quantification, although the quantification may be relatively imprecise. For definitive confirmation, approximately 10 percent of the screening data are confirmed using analytical methods and quality control procedures and criteria associated with definitive data. Screening data without associated confirmation data are generally not considered to be data of known quality.

Definitive data are generated using rigorous analytical methods, such as EPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. Methods generating definitive data produce tangible raw data (e.g., chromatograms, spectra, digital values) in the form of paper printouts or computer-generated electronic files. Data may be generated at the site or at an off-site location, as long as the quality control requirements are satisfied. For the data to be definitive, either analytical or total measurement error must be determined.

(2) DQO = Measurement-specific Data Quality Objective requirements will be defined in the QAPP.

Table 5-1
Field Program Summary
San German Groundwater Contamination Site
San German, Puerto Rico

Sampling Task	Subtasks	Locations	Sampling/Installation Activities	Purpose
Southern Investigation				
Existing Well Investigation	Existing Well Inspection	Inactive PRASA Supply Wells, Wallace wells, El Real well, Santa Marta well, and Elderly facility well	Inspect viability of wells, survey well elevations	Provide initial estimates on the extent of contamination and aquifer characteristics such as fracture depth and groundwater flow direction.
	Existing Well Sampling		Low-flow Groundwater sampling	
PSA Reconnaissance	PSA Inspections	RIP: Wallace, Baytex, CC Label, Garaje Rodriguez, and GE. Other: Acorn Cleaners. North of the river: Cordis/OMJ, Baxter, Abandoned Gulf, and HP	Records search, site inspections and interviews	Identify additional properties at which investigations should be performed.
PSA Investigations	Wallace Investigation	20 borings (10 borings at each PSA)	Surface/subsurface soil and groundwater screening sampling	Support identification of PRPs. Determine the Presence and extent of residual contamination in the OB soil and groundwater at PSAs.
	Acorn Investigation			
	1 additional PSA investigation assumed	10 borings at the PSA		
Groundwater Screening Program	Adjacent to Wallace	Up to 10 borings assumed*	Groundwater screening sampling in transects	Identify PSAs from which VOC contamination may be migrating. Delineate the lateral and vertical boundaries of VOC contamination in the OB. Provide data to support the location and design of MWs. Provide information on the OB lithology.
	Upgradient in RIP	Up to 10 borings assumed*		
	Downgradient	Up to 20 borings assumed*		
	Adjacent to Acorn	Up to 5 borings assumed*		
Southern Well Installation Program	Borehole Installation	10 multiport well locations	Install and develop 10 boreholes to 200-ft. Bedrock coring at 2 of 10 locations.	Provide boreholes to use for testing and installation of multi-port MWs.
	Geophysical Logging		Downhole geophysical logging at each borehole. Fluid resistivity and temperature, natural gamma, optical/acoustic televiewer, mechanical caliper and vertical flow (heat pulse).	Provide initial estimates of the lithology, fracture zones, vertical flow and water bearing zones of each borehole. Will allow for MW ports to be placed to correctly monitor the plume.
	Packer Sampling		Groundwater samples collected from up to 6 zones per borehole using packers.	Provide initial estimates of contaminant concentrations in various fracture zones. Will allow for MW ports to be placed to correctlly monitor the plume.
	Borehole Hydraulic Conductivity Testing		Hydraulic conducitivity testing performed during Flute System liner installation	Provide estimates of the bedrock hydraulic properties.
	Multiport Well Installation		Install and develop FLUTe System multi-port wells, assuming 5 ports at each location	Define the boundaries of the VOC contamination in the bedrock.
	OB Well Installation	10 OB MWs paired with multi-port well locations	Install and develop 10 conventional MWs	Verify data collected during the groundwater screening program.
MW Sampling	Round 1 MW Sampling (VOC only)	10 multiport wells (50 ports) and 10 OB wells	Low-flow groundwater sampling	Define the boundaries of VOC (only) contamination in the OB and bedrock.

Table 5-1
Field Program Summary
San German Groundwater Contamination Site
San German, Puerto Rico

Sampling Task	Subtasks	Locations	Sampling/Installation Activities	Purpose
Northern Investigation				
Groundwater Screening Program	Adjacent to HP/North of Rio Guanijibo	Up to 10 borings assumed*	Groundwater screening sampling in transects	Identify PSAs from which VOC contamination may be migrating. Delineate the lateral and vertical boundaries of VOC contamination in the OB. Provide data to support the location and design of MWs. Provide information on the OB lithology.
Northern Well Installation Program	Borehole Installation	5 multiport well locations	Install and develop 5 boreholes to 200-ft. Bedrock coring at 1 of 5 locations	Provide boreholes to use for testing and installation of multi-port MWs.
	Geophysical Logging		Downhole geophysical logging at each borehole. Fluid resistivity and temperature, natural gamma, optical/acoustic televiewer, mechanical caliper and vertical flow (heat pulse)	Provide initial estimates of the lithology, fracture zones, vertical flow and water bearing zones of each borehole. Will allow for MW ports to be placed to correctly monitor the plume.
	Packer Sampling		Groundwater samples collected from up to 6 zones per borehole using packers.	Provide initial estimates of contaminant concentrations in various fracture zones. Will allow for MW ports to be placed to correctlly monitor the plume.
	Borehole Hydraulic Conductivity Testing		Hydraulic conducitivity testing performed during Flute System liner installation	Provide estimates of the bedrock hydraulic properties.
	Multiport Well Installation		Install and develop FLUTe System multi-port wells, assuming 5 ports at each location	Define the boundaries of the VOC contamination in the bedrock.
	OB Well Installation	5 OB MWs paired with multi-port well locations	Install and develop 5 conventional MWs	Verify data collected during the groundwater screening program.
MW Sampling	Round 2 MW Sampling	15 multiport wells (75 ports) and 15 OB wells	Low-flow groundwater sampling	Confirm contaminant profiles in and define boundaries of contamination in the OB and bedrock.
	Round 3 MW Sampling			
Groundwater/Surface Water Interaction Evaluation	Wellpoint Stream/ Guage Installation	5 wellpoints and 1 stream guage installed in Rio Guanajibo	Install and survey 5 wellpoints and 1 stream guage into the river bed	Assess interaction between surface water/ groundwaterin the site area
	Long Term Monitoring	Supply wells, wellpoints and MWs	Install transducers to monitor flutuations in water levels	Evaluate temporal fluctuations in groundwater sand surface water levels in the vicinity of the affected supply wells in response to precipitation and local pumping
	Wellpoint Sampling	5 wellpoints	Passive diffusion bag sampling	Provide data on the chemistry of groundwater seeping into the river
Surface Water/Sediment Investigation	Rio Guanajibo	7 locations (5 co-located with wellpoints, 1 upgradient and 1 downgradient)	Surface water and sediment sampling	Determine if contaminated groundwater has impacted Rio Guanajibo and it tributaries surface water and sediment
	Unnamed Tributary	5 locations		
	PSA Drainage Features	12 samples from PSA drainage features including catch basins and channels.		Determine if contaminants are present within PSA drainage structures and if this contamination impacts media at identified points of discharge
Hydrogeological Investigation	Slug Testing	8 OB MWs	Rising and falling head slug tests	Provide estimates of the OB hydraulic conductivity
	Aquifer Test	PRASA Supply Well	Pump test (length TBD)	Refine estimates of the bedrock hydraulic properties. Detemine connection between supply well fractures and other areas of site. Provide understanding of pumping affects on the bedrock aquifer.
Indoor Air Evaluation (optional)	Indoor Air Sampling	TBD	TBD	Optional activity to be discussed with EPA if necessary.

Notes: * actual number will depend on what is necessary to delineate contamination

Abbreviations:

EPA U.S. Environmental Protection Agency
HP Hewlet Packard
PRASA Puerto Rico Aqueduct and Sewer Authority
PSA Potential Source Area
RIP Retiro Industrial Park
TBD To be determined
VOC Volatile Organic Compound
OB overburden
MW monitoring well
ft feet

Table 5-2
Summary of Sampling and Analyses
San German Groundwater Contamination Site
San German, Puerto Rico

Sampling Locations	Sample Type	Analytical Parameter: CLP Analyses	Analytical Parameter: Non-RAS analyses	Field Parameters	Sampling Frequency/Intervals	Total Samples
Southern Investigation						
Existing Well Sampling- Assume 13 samples	Groundwater	TCL trace VOCs	None	pH, Temp, Cond, DO, ORP and Turb	1 sample per conventional well. 3 samples per open bedrock well. Low flow groundwater samples.	13
PSA Investigations - 30 soil borings (10 per PSA) in overburden.	Soil	TCL VOCs (Preliminary 24 hr TAT) SVOCs, PCBs and Pesticides, TAL Metals	None	None	4 samples per boring. (0-2, 5-7, 10, and 20 ft bgs)	120
		None	TOC and grain size		2 samples per boring. (0-2, and 5-7 ft bgs)	60
	Groundwater	TCL trace VOCs	None	pH, Temp, Cond, DO, ORP and Turb	3 samples per boring collected 2-ft below water table, at top of bedrock, and every 10-ft in between (assume 30, 40 and 50 ft bgs)	90
Groundwater Screening Investigation - Assume 45 groundwater screening borings.	Groundwater	None	TCL VOCs (24 hr TAT)	None	Assume 3 samples per boring collected 2-ft below water table, top of bedrock and every 10-ft in	135
Borehole Sampling - 10 boreholes	Groundwater	TCL VOCs (Preliminary 24 hr TAT)	None	None	Assume 6 samples per borehole	60
Monitoring Well Sampling Round 1: 10 multiport wells (50 ports) and 10 overburden monitoring wells	Groundwater	TCL VOCs	None	Ferrous iron, pH, Temp, Cond, DO, ORP and Turb	1 sample per port at 10 wells with 5 ports each, and 10 conventional wells	60
Northern Investigation						
Borehole Sampling - 5 boreholes	Groundwater	TCL VOCs (Preliminary 24 hr TAT)	None	None	Assume 6 samples per borehole	30
Monitoring Well Sampling Round 2: 15 multiport wells (75 ports) and 15 overburden monitoring wells	Groundwater	TCL VOCs, SVOCs, PCBs and Pesticides, TAL Metals	None	Ferrous iron, pH, Temp, Cond, DO, ORP and Turb	1 sample per port at 15 wells with 5 ports each, and 15 conventional wells	90
		None	chloride, methane, ethane, ethene, nitrate/nitrite, sulfate, sulfide alkalinity, ammonia, hardness, TKN, chloride, TDS, TSS, and TOC		1 sample per port, sampling 2 ports per well at 15 wells	34
Monitoring Well Sampling Round 3: 15 multiport wells (75 ports) and 15 overburden monitoring wells		TCL VOCs, SVOCs, PCBs and Pesticides, TAL Metals	None		1 sample per port at 15 wells with 5 ports each, and 15 conventional wells	90
		None	chloride, methane, ethane, ethene, nitrate/nitrite, sulfate, sulfide alkalinity, ammonia, hardness, TKN, chloride, TDS, TSS, and TOC		1 sample per port, sampling 2 ports per well at 18 wells	34
Groundwater Screening Investigation - Assume 10 groundwater screening borings.	Groundwater	None	TCL VOCs (24 hr TAT)	None	Assume 3 samples per boring collected 2-ft below water table, top of bedrock and every 10-ft in	30
Surface Water/ Sediment Sampling	Surface Water	TCL VOCs, SVOCs, PCBs and Pesticides, TAL Metals,	Alkalinity, ammonia, hardness, nitrate/nitrite, TKN, sulfate, sulfide,chloride, TDS, TSS,and TOC	pH, Temp, Cond, DO, ORP and Turb	7 locations in the Rio Guanajibo, 5 locations in the unnamed tributary, 12 locations in catch basins or other drainage structures.	24
	Sediment		TOC, pH and grain size	None		24
Groundwater/Surface water interaction - Groundwater seepage sampling: 5 wellpoints in Rio Guanajibo	Seepage water	TCL VOCs, SVOCs, PCBs, Pesticides and TAL Metals	Alkalinity, ammonia, hardness, nitrate/nitrite, TKN, sulfate, sulfide, chloride, TDS, TSS,and TOC	pH, Temp, Cond, DO, ORP and Turb	5 locations in the Rio Guanajibo	5

Acronyms:

Alk	Alkalinity	SVOC	Semi-Volatile Organic Compound
bgs	below ground surface	TAL	Target Analyte List
CLP	Contract Laboratory Program	TAT	Turn-around Time
Cond	Conductivity	TCL	Target Compound List
DO	Dissolved Oxygen	TDS	Total Dissolved Solids
ft	feet	Temp	Temperature
GW	Groundwater	TOC	Total Organic Carbon
ORP	Oxidation Reduction Potential	TSS	Total Suspended Solids
PCB	Polychlorinated Biphenyls	Turb	Turbidity
RAS	Routine Analytical Services	VOC	Volatile Organic Compound

Table 5-3
Summary of Monitoring Well Locations
San German Groundwater Contamination Site
San German, Puerto Rico

Site Area	Wells	Estimated Depth to Bedrock (ft bgs)	Estimated Total Multiport Well Depth (ft bgs)	Estimated Number of Ports at Multiport Wells	Estimated OB Well Depth (ft bgs)	Purpose
Southern Program						
Wallace / RETIRO Industrial Properties	4 pairs of Multiport/OB wells	30	200	5 per well	30	Plume Delineation and Monitoring. Support identification of source areas. Determine the presence and extent of residual contamination in the overburden soil and groundwater at PSAs.
PRASA Wellfield Area	1 pair of Multiport/OB wells	70	200	5 per well	70	Plume Delineation and Monitoring. Provide monitoring points for use in aquifer testing. Provide vertical contaminant profile near supply wells.
Background (south of Rio Guanajibo)	1 pair of Multiport/OB wells	30	200	5 per well	30	Plume Delineation and Monitoring. Provide upgradient background monitoring point.
Plume Area (south of Rio Guanajibo)	4 pairs of Multiport/OB wells	50	200	5 per well	50	Plume Delineation and Monitoring
Northern Program						
Adjacent to HP	3 pairs of Multiport/OB wells	50	200	5 per well	50	Plume Delineation and Monitoring. Support identification of source areas. Determine the presence and extent of residual contamination in the
Adjacent to Rio Guanajibo	1 pair of Multiport/OB wells	70	200	5 per well	70	Plume Delineation and Monitoring. Provides a monitoring point on the north side of the river for monitoring during the aquifer test.
Background (north of Rio Guanajibo)	1 pair of Multiport/OB	30	200	5 per well	30	Plume Delineation and Monitoring. Provide upgradient background monitoring point.

Notes:
1. Proposed well locations are shown on Figure 5-2.

Abbreviations:
bgs below ground surface
ft feet
OB overburden

CDM

Table 5-4
Proposed RI Report Format
San German Groundwater Contamination Site
San German, Puerto Rico

1.0 Introduction
- 1.1 Purpose of Report
- 1.2 Site Background
  - 1.2.1 Site Description
  - 1.2.2 Site History
  - 1.2.3 Previous Investigations
- 1.3 Report Organization

2.0 Study Area Investigation
- 2.1 Surface Features
- 2.2 Contaminant Source Investigations
- 2.3 Meteorological Investigations
- 2.4 Surface Water and Sediment Investigations
- 2.5 Geological Investigations
- 2.6 Soil and Vadose Zone Investigation
- 2.7 Groundwater Investigation
- 2.8 Human Population Surveys
- 2.9 Ecologic Investigation

3.0 Physical Characteristics of Site
- 3.1 Topography
- 3.2 Meteorology
- 3.3 Surface Water and Sediment
- 3.4 Geology
- 3.5 Hydrogeology
- 3.6 Soils
- 3.7 Demographics and Land Use

4.0 Nature and Extent of Contamination
- 4.1 Sources of Contamination
- 4.2 Soils
- 4.3 Groundwater
- 4.4 Surface Water and Sediments

5.0 Contaminant Fate and Transport
- 5.1 Routes of Migration
- 5.2 Contaminant Persistence
- 5.3 Contaminant Migration

6.0 Baseline Risk Assessment (submitted separately from RI report)

7.0 Screening Level Ecological Risk Assessment (submitted separately from RI report)

8.0 Summary and Conclusions
- 7.1 Source(s) of Contamination
- 7.2 Nature and Extent of Contamination
- 7.3 Fate and Transport
- 7.4 Risk Assessment
- 7.5 Data Limitations and Recommendations for Future Work
- 7.6 Recommended Remedial Action Objectives

Appendices: Boring Logs, Hydrogeologic Data, Analytical Data/QA/QC Evaluation

Table 5-5
Detailed Evaluation Criteria for Remedial Alternatives
San German Groundwater Contamination Site
San German, Puerto Rico

- SHORT-TERM EFFECTIVENESS
  - -Protection of community during remedial action
  - -Protection of workers during remedial actions
  - -Time until remedial response objectives are achieved
  - -Environmental impacts
- LONG-TERM EFFECTIVENESS
  - -Magnitude of risk remaining at the site after the response objectives have been met
  - -Adequacy of controls
  - -Reliability of controls
- REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT
  - -Treatment process and remedy
  - -Amount of hazardous material destroyed or treated
  - -Reduction in toxicity, mobility or volume of the contaminants
  - -Irreversibility of the treatment
  - -Type and quantity of treatment residuals
- IMPLEMENTABILITY
  - -Ability to construct technology
  - -Reliability of technology
  - -Ease of undertaking additional remedial action, if necessary
  - -Monitoring considerations
  - -Coordination with other agencies
  - -Availability of treatment, storage capacity, and disposal services
  - -Availability of necessary equipment and specialists
  - -Availability of prospective technologies
- COST
  - -Capital costs
  - -Annual operating and maintenance costs
  - -Present worth
  - -Sensitivity Analysis
- COMPLIANCE WITH ARARs
  - -Compliance with chemical-specific ARARs
  - -Compliance with action-specific ARARs
  - -Compliance with location-specific ARARs
  - -Compliance with appropriate criteria, advisories and guidance
- OVERALL PROTECTION OF HUMAN HEALTH AND ENVIRONMENT
- STATE ACCEPTANCE
- COMMUNITY ACCEPTANCE

Table 5-6
Proposed FS Report Format
San German Groundwater Contamination Site
San German, Puerto Rico

1.0 Introduction
- 1.1 Purpose and Organization of Report
- 1.2 Site Description and History
- 1.3 Site
- 1.4 Source(s) of Contamination
- 1.5 Nature and Extent of Contamination
- 1.6 Contaminant Fate and Transport
- 1.7 Baseline Risk Assessment

2.0 Identification and Screening of Technologies
- 2.1 Remedial Action Objectives for Each Medium
  - Contaminants of Interest
  - Allowable Exposure Based on Risk Assessment
  - Allowable Exposure Based on ARARs
  - Development of Remedial Action Objectives
- 2.2 General Response Actions for Each Medium
  - No Action
  - Containment
  - Technologies
- 2.3 Screening of Technology and Process Option for Each Medium
  - 2.3.1 Description of Technologies
  - 2.3.2 Screening of Technologies using
  - Effectiveness
  - Implementability
  - Cost

3.0 Development of Alternatives
- 3.1 Development of Alternatives for Each Medium
- 3.2 Screening of Alternatives
  - 3.2.1 Alternative 1

4.0 Detailed Analysis of Alternatives
- 4.1 Description of Evaluation Criteria
  - Short-Term Effectiveness
  - Long-Term Effectiveness and Permanence
  - Implementability
  - Reduction of Mobility, Toxicity, or Volume Through Treatment
  - Compliance with ARARs
  - Overall Protection
  - Cost
  - State Acceptance
  - Community Acceptance
- 4.2 Individual Analysis of Alternatives
  - 4.2.1 Alternative 1
- 4.3 Summary

5.0 Comparative Analysis of Alternatives
- 5.1 Comparison Among Alternatives For Each Medium

Figures

Figures

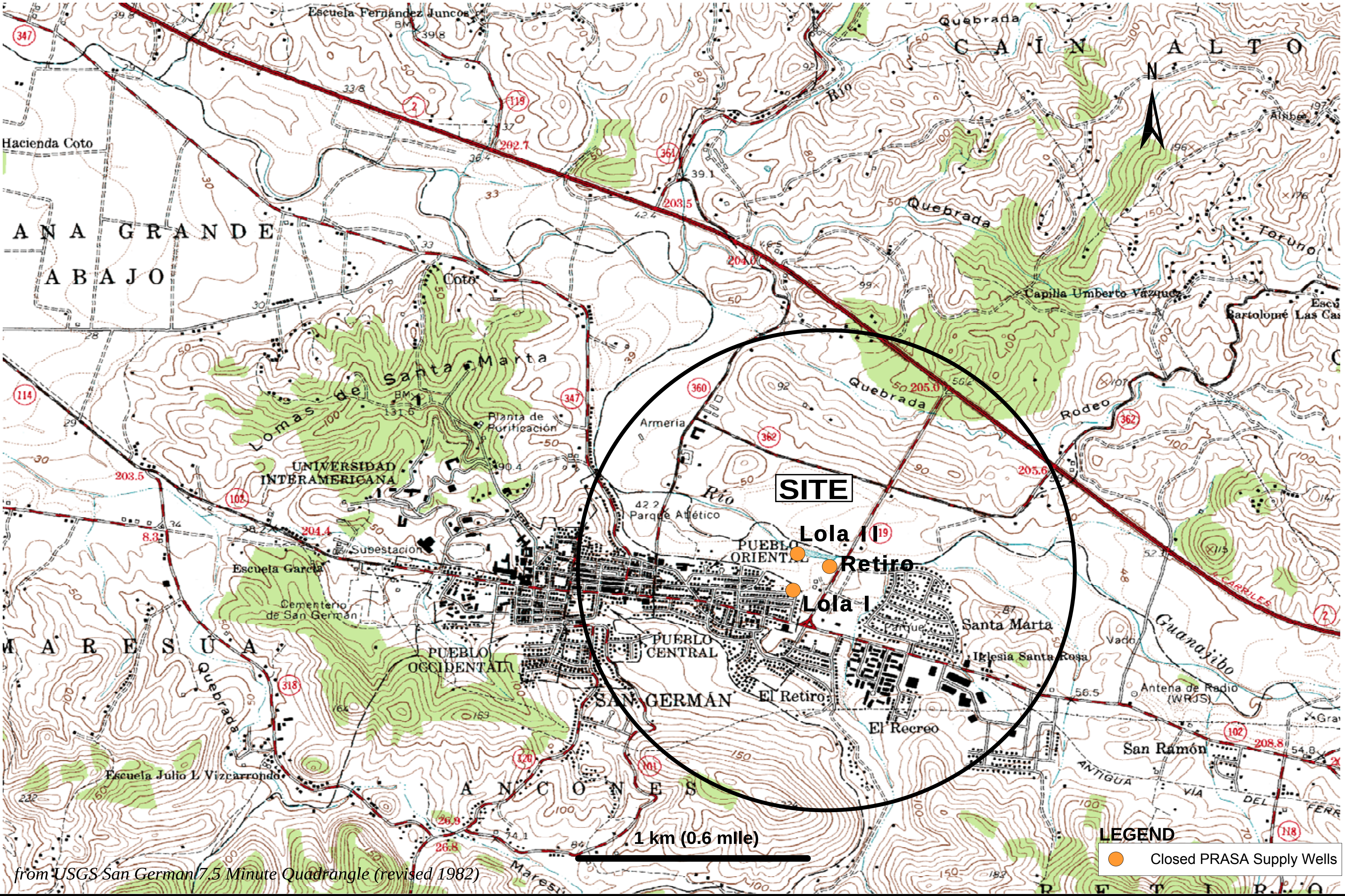
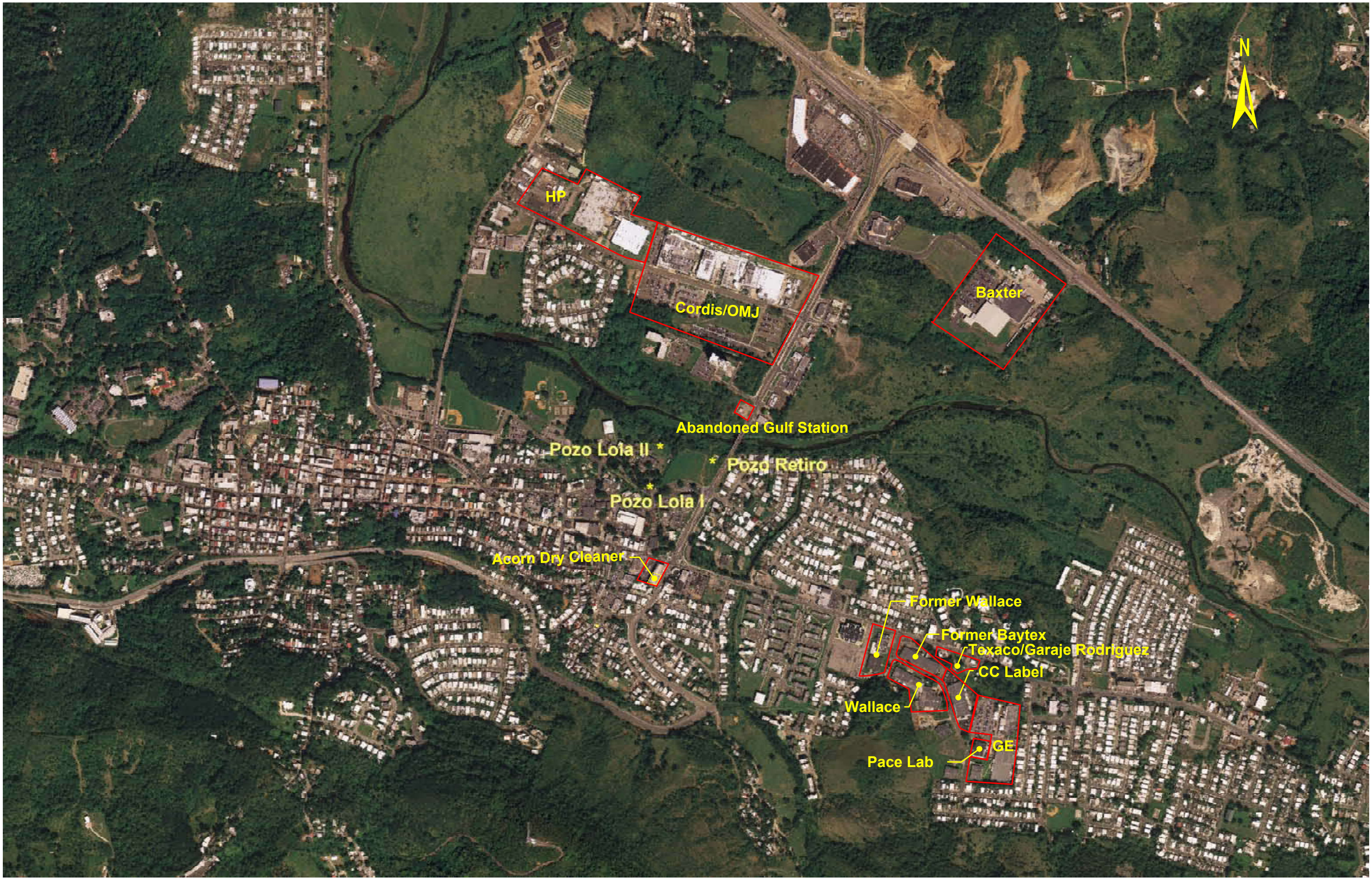


Figure 1-1
SITE LOCATION MAP
San German Ground Water Contamination Site
San German, Puerto Rico



1,000 0 500 1,000

Approximate Scale (in feet)

Figure 1-2
SITE MAP
San German Ground Water Contamination Site
San German, Puerto Rico

CDM

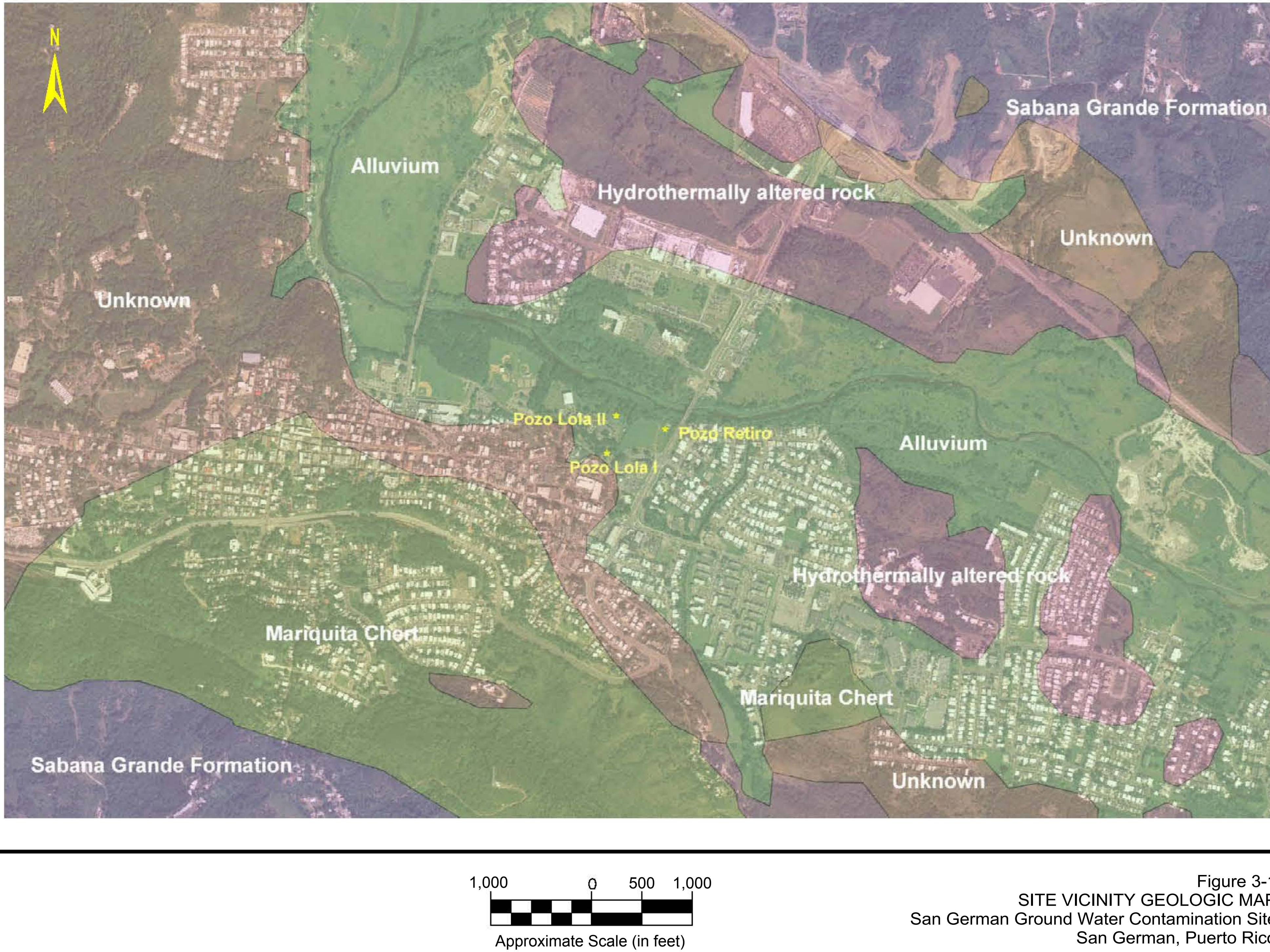


Figure 3-1
SITE VICINITY GEOLOGIC MAP
San German Ground Water Contamination Site
San German, Puerto Rico

CDM

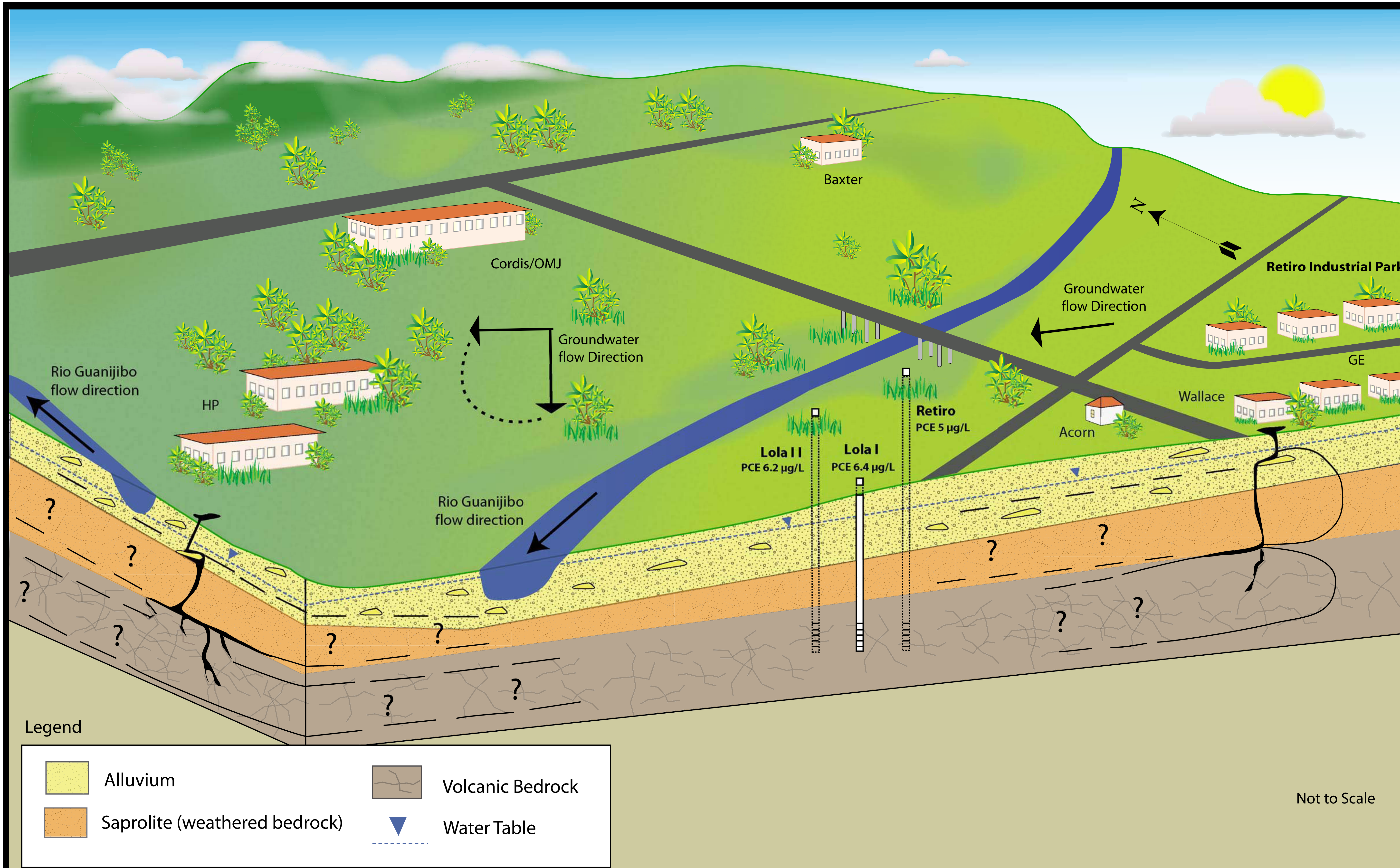
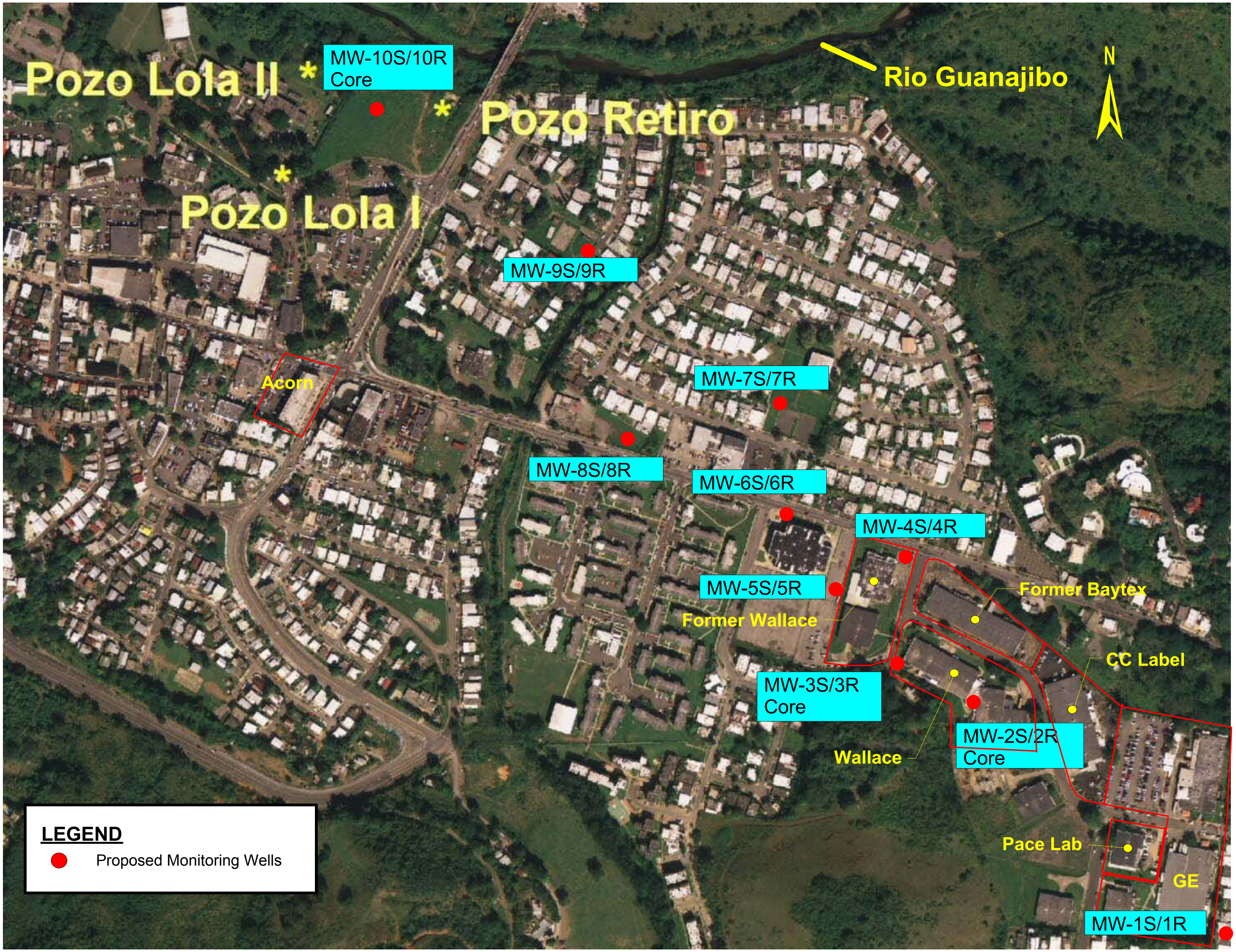


Figure 3-2
CONCEPTUAL SITE MODEL
San German Ground Water Contamination Site
San German, Puerto Rico

CDM



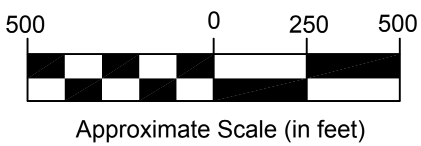
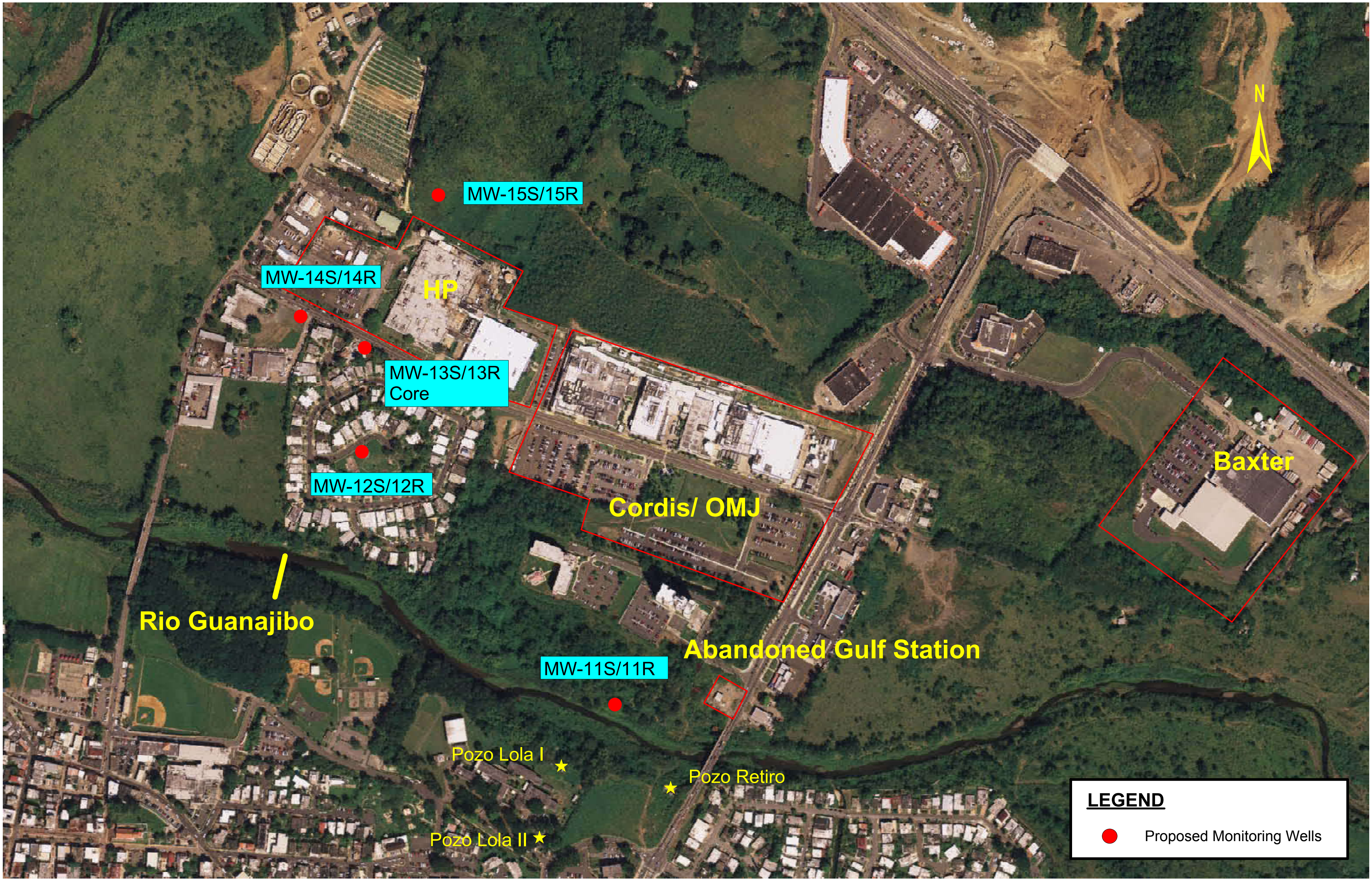


Figure 5-1
PROPOSED MONITORING WELL LOCATIONS SOUTH OF RIO GUANAJIBO
San German Ground Water Contamination Site
San German, Puerto Rico

CDM

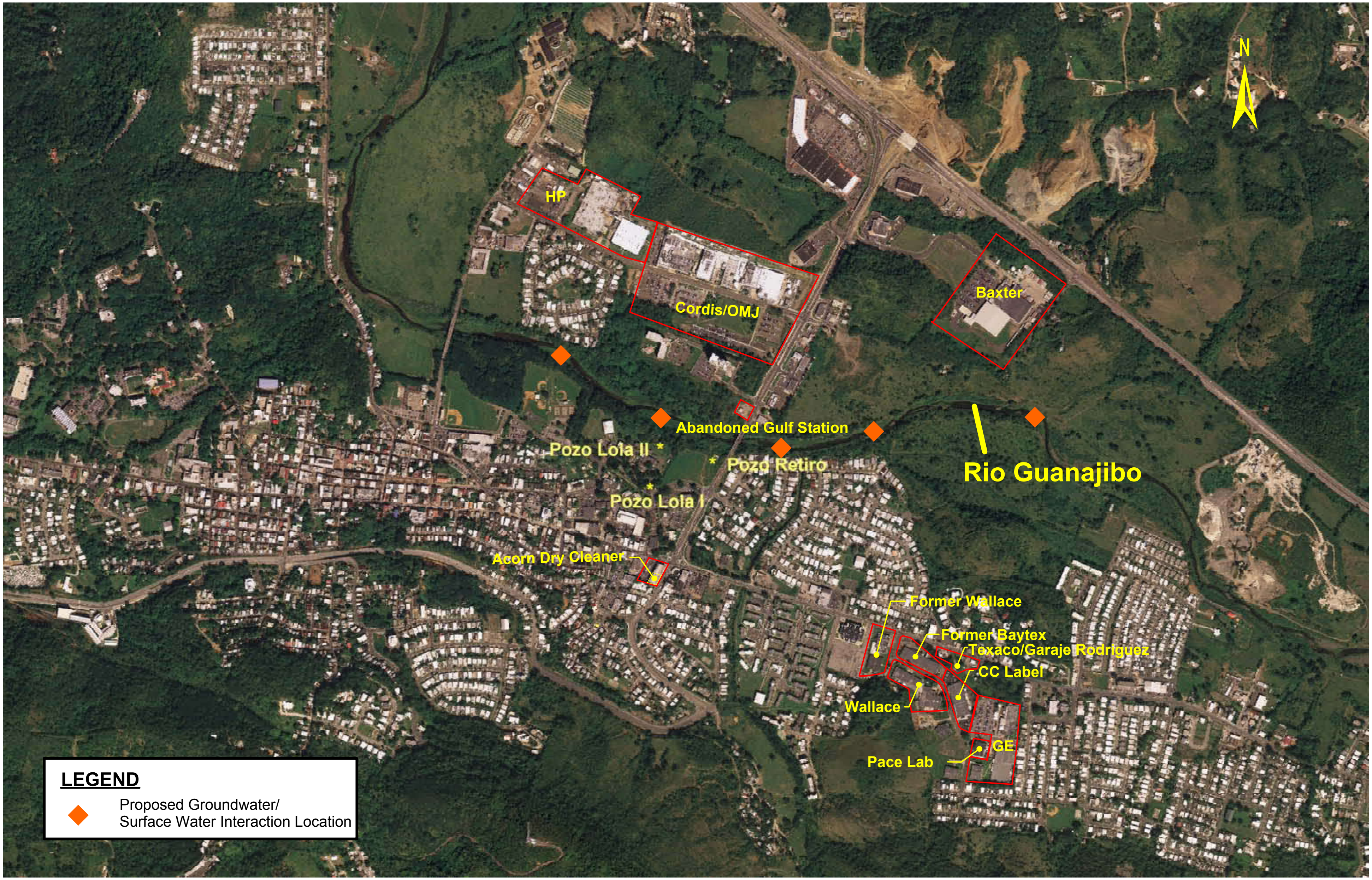


500 0 250 500

Approximate Scale (in feet)

Figure 5-2
PROPOSED MONITORING WELL LOCATIONS NORTH OF RIO GUANAJIBO
San German Ground Water Contamination Site
San German, Puerto Rico

CDM



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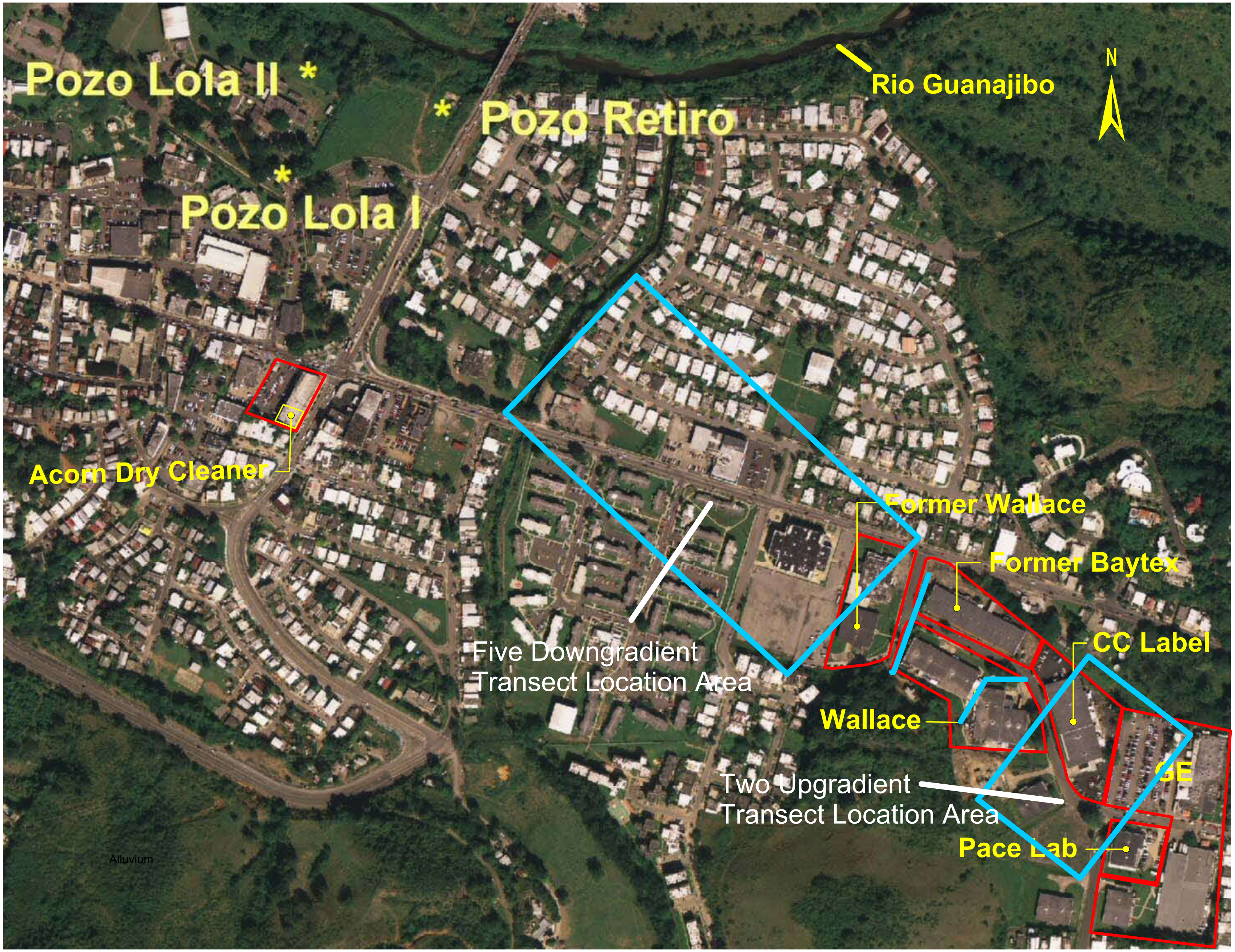
Approximate Scale (in feet)

Figure 5-3
GROUNDWATER/SURFACE WATER INTERACTION LOCATIONS
San German Ground Water Contamination Site
San German, Puerto Rico

CDM



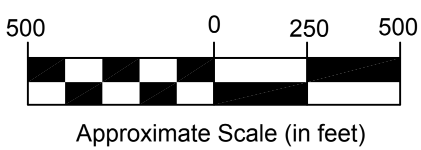
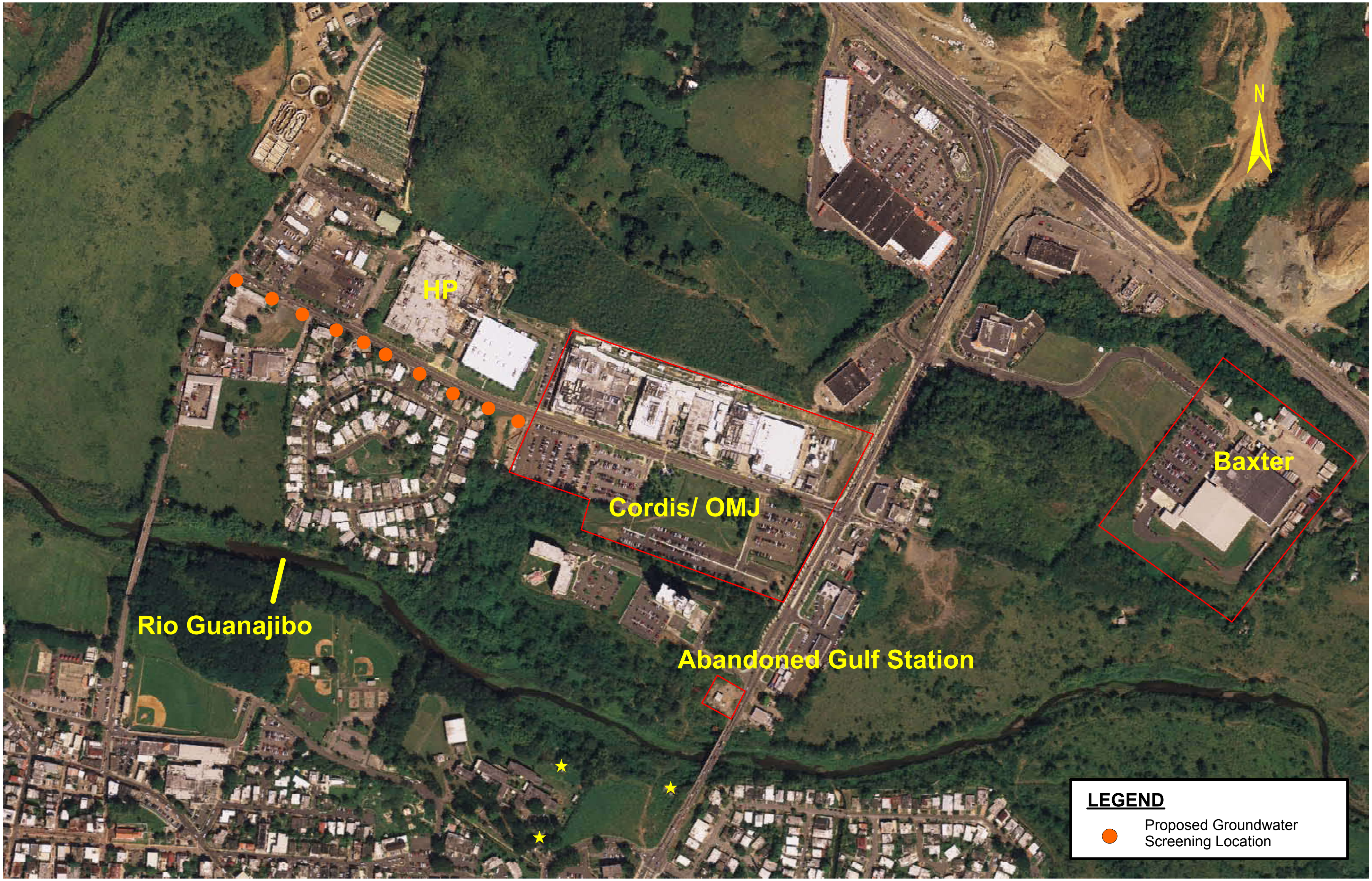


Figure 5-4
PROPOSED SOUTHERN (WALLACE) GROUNDWATER SCREENING TRANSECT LOCATION MAP
San German Ground Water Contamination Site
San German, Puerto Rico

CDM



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Approximate Scale (in feet)

Figure 5-5
PROPOSED HP GROUNDWATER SCREENING LOCATIONS
San German Ground Water Contamination Site
San German, Puerto Rico

CDM

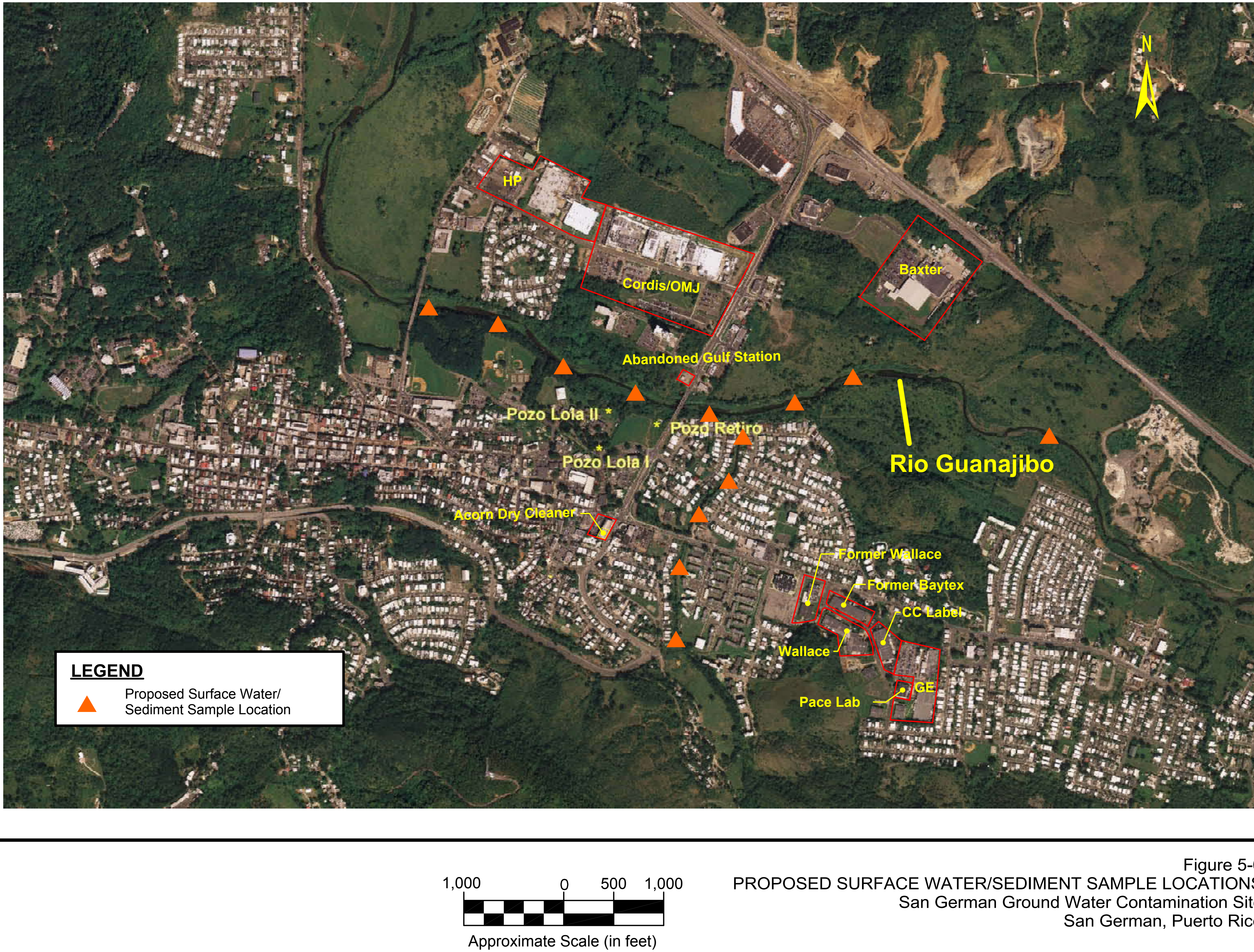


Figure 5-6
PROPOSED SURFACE WATER/SEDIMENT SAMPLE LOCATIONS
San German Ground Water Contamination Site
San German, Puerto Rico

CDM

Figure 6-1
PROPOSED PROJECT SCHEDULE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SAN GERMAN GROUNDWATER CONTAMINATION SITE
SAN GERMAN, PUERTO RICO

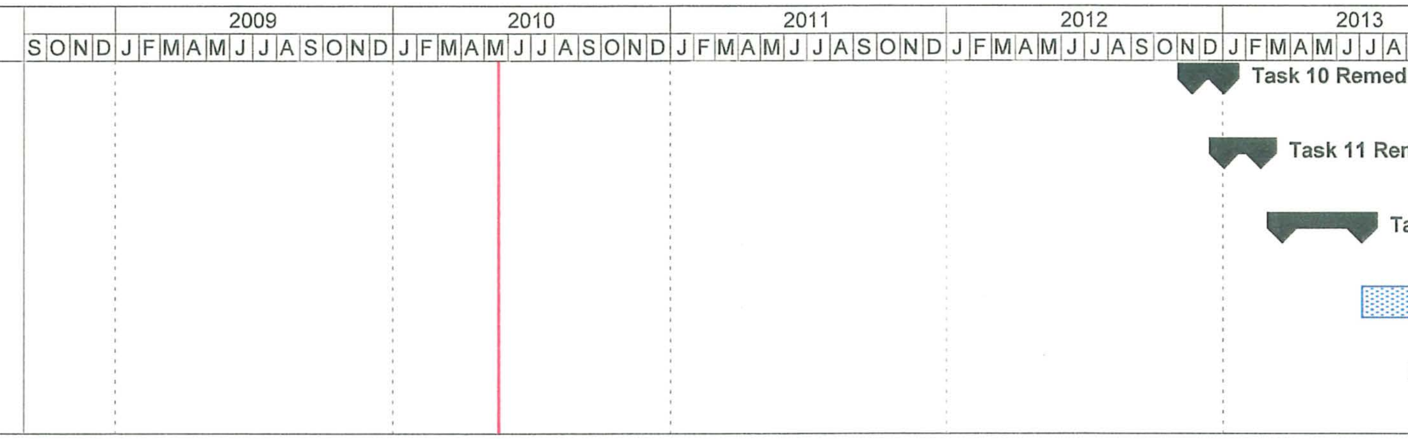
ID	Task Name	Subtask	Duration	Start	Finish	Predecessors
1	**Task 1 Project Planning and Support**		**1262 days**	**Thu 9/25/08**	**Fri 7/26/13**	
2	Project Administration	1.1	526 days	Thu 9/25/08	Thu 9/30/10	
3	**Attend Scoping Meeting**	**1.2**	**29 days**	**Wed 10/15/08**	**Mon 11/24/08**	
6	Conduct Site Visit	1.3	1 day	Mon 10/6/08	Mon 10/6/08	
7	**Develop Draft Work Plan and Associated Cost Estimate**	**1.4**	**360 days**	**Tue 12/16/08**	**Mon 5/3/10**	
11	**Negotiate and Revise Draft Work Plan**	**1.5**	**24 days**	**Fri 6/18/10**	**Wed 7/21/10**	
14	Evaluate Existing Data and Documents	1.6	42 days	Fri 6/18/10	Mon 8/16/10	16SS
15	**QAPP**	**1.7**	**65 days**	**Fri 6/18/10**	**Thu 9/16/10**	
19	**HASP**	**1.8**	**45 days**	**Fri 6/18/10**	**Thu 8/19/10**	
23	**Meetings**	**1.10**	**844 days**	**Tue 5/4/10**	**Fri 7/26/13**	
32	**Subcontract Procurement**	**1.11**	**60 days**	**Fri 6/18/10**	**Thu 9/9/10**	
40	**Subcontract Management**	**1.12**	**201 days**	**Fri 9/24/10**	**Fri 7/1/11**	
48	Pathway Analysis Report	1.13	50 days	Wed 7/11/12	Tue 9/18/12	113
49	**Task 2 Community Involvement**	**2**	**802 days**	**Wed 10/13/10**	**Thu 11/7/13**	
57	**Task 3 Field Investigation**	**3**	**432 days**	**Fri 9/10/10**	**Mon 5/7/12**	
104	**Task 4 Sample Analysis**	**4**	**400 days**	**Wed 11/17/10**	**Tue 5/29/12**	
109	**Task 5 Analytical Support and Data**	**5**	**240 days**	**Wed 8/10/11**	**Tue 7/10/12**	
116	**Task 6 Data Evaluation**	**6**	**117 days**	**Wed 6/13/12**	**Thu 11/22/12**	
130	**Task 7 Assessment of Risk**	**7**	**65 days**	**Wed 7/11/12**	**Tue 10/9/12**	
139	**Task 8 Treatability Studies/Pilot Testing**	**8**	**6 days**	**Fri 11/23/12**	**Fri 11/30/12**	
144	**Task 9 Remedial Investigation Report**	**9**	**105 days**	**Fri 11/23/12**	**Thu 4/18/13**	

Project: Schedule-a
Date: Wed 5/19/10

Task | Split | Progress | Submittal | Meeting | Summary

Figure 6-1
PROPOSED PROJECT SCHEDULE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SAN GERMAN GROUNDWATER CONTAMINATION SITE
SAN GERMAN, PUERTO RICO

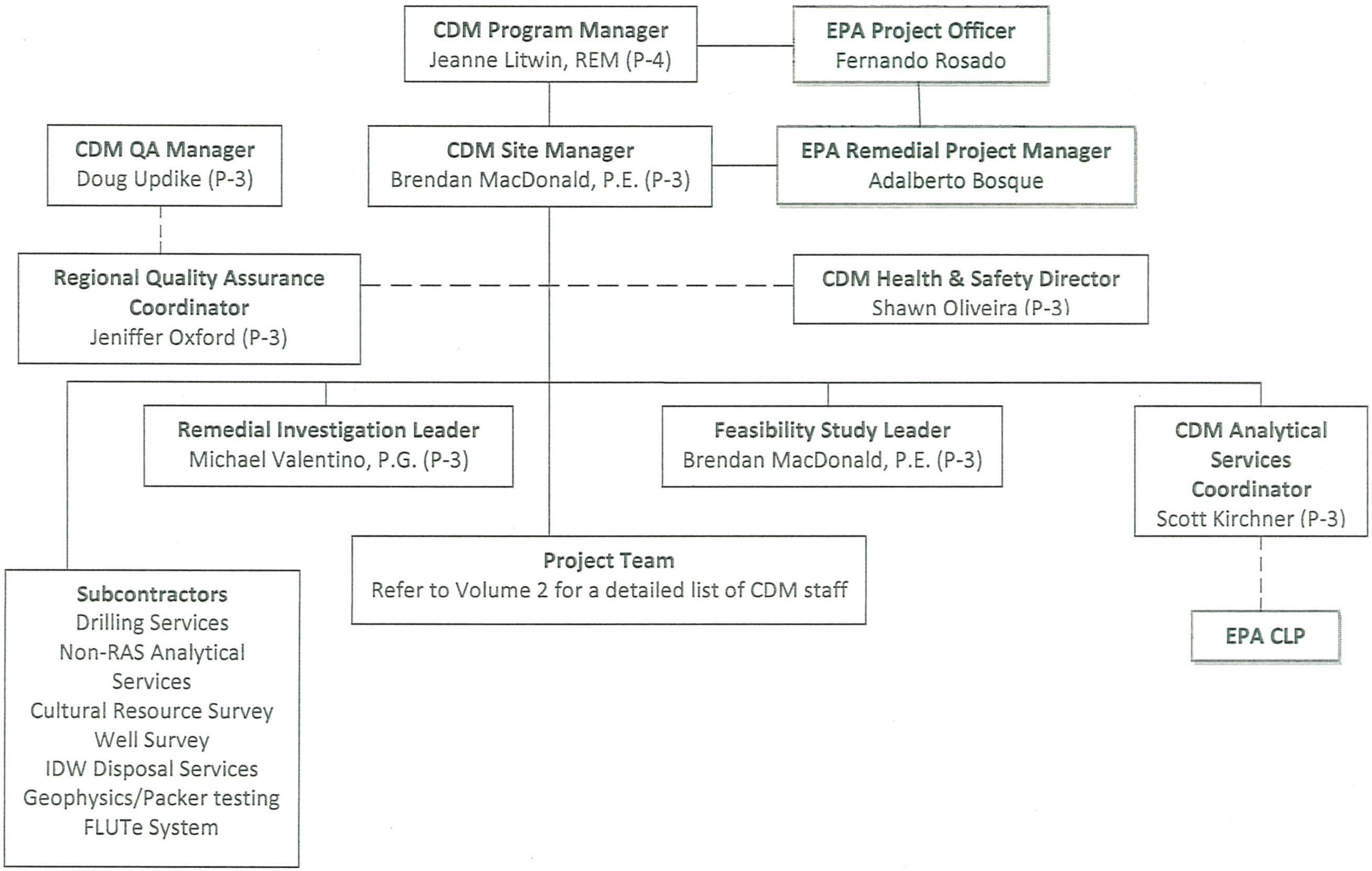
ID	Task Name	Subtask	Duration	Start	Finish	Predecessors
148	**Task 10 Remedial Alternatives Screening**	**10**	**30 days**	**Fri 11/23/12**	**Thu 1/3/13**	
150	**Task 11 Remedial Alternatives Evaluation**	**11**	**35 days**	**Fri 1/4/13**	**Thu 2/21/13**	
153	**Task 12 Feasibility Study Report**	**12**	**75 days**	**Fri 3/22/13**	**Thu 7/4/13**	
157	Task 13 Post RI/FS Support (Optional)	13	60 days	Fri 7/5/13	Thu 9/26/13	156
158	**Task 14 Work Assignment Closeout**	**14**	**30 days**	**Fri 9/27/13**	**Thu 11/7/13**	



Project: Schedule-a
Date: Wed 5/19/10

Task | Split | Progress | Submittal | Meeting | Summary

Figure 7-1
Project Organization
San German Groundwater Contamination Site
San German, Puerto Rico



Appendices

Appendices

Appendix A

Data and Maps from Previous Investigations

A-1

2002 Hewlett Packard Hydrogeologic Investigation Report

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
BR-308	Oct-00	<1.0	<10	18	<10	<1.0	<1.0	<1.0	<1.0	<1.0			<10	<1.0	<1.0	<1.0	23	<1.0	<1.0	13	<1.0	<10	<10	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	36	<1.0	1.0	23	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	35	<1.0	<1.0	28	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.4J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	30	<1.0	<1.0	19	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	0.18J	<1.0	0.6J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	29	<1.0	0.27J	22	<1.0	<1.0	<1.0	0.13J	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	48	<1.0	<1.0	38	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.45J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	21	<1.0	<1.0	18	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.37J	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	12	<1.0	<1.0	8.6	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.54J	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	8.3	<1.0	<1.0	8.9	<1.0	<1.0	<1.0	<1.0	<2.0
DEC-201R	Sep-92	<20	<50	<20		150	<20	70	<20				<20	<20	<20	<20	<20		<50	310	<20	<50	<20	<20	
	Feb-93	<20	<100	<20		120	<20	60	<20				<20	20	<20	<20	<20		<10	250	<20	<100	<20	<20	
DEC-202O	Feb-93	<2.0	<10	<2.0		19	<2.0	77	<2.0				<2.0	30	200	<2.0	5.0		<10	37	<2.0	<10	<2.0	<2.0	
DEC-203R	Sep-92	<2.0	<5.0	3.0		24	<2.0	140	<2.0				<2.0	59	14	<2.0	60		<5.0	2.0	<2.0	<5.0	<2.0	<2.0	
	Feb-93	<20	<100	<20		<20	<20	180	<20				<20	50	280	<20	30		<100	<20	<20	<100	<20	<20	
	Mar-02	<1.0	<1.0	<1.0	7.4	5.6	<1.0	1.4	1.8	<1.0			<5.0	<1.0	<1.0	<1.0	4.6	<1.0	3.7	25	<1.0	0.29J	<1.0	0.19J	<1.0
	Jun-02	<1.0	<1.0	<1.0	5.2	5.0	<1.0	0.72J	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	4.4	<1.0	2.5	18	<1.0	0.37J	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	3.2B	2.9	<1.0	0.51J	<1.0	<1.0	<1.0	<1.0	<5	0.42J	<1.0	<1.0	3.3	<1.0	1.5	9.4	<1.0	0.27J	<1.0	<1.0	<2.0
DEC-204O	Sep-92	<2.0	<5.0	7.0		47	<2.0	120	<2.0				<2.0	68	50	<2.0	99		<5.0	9.0	<2.0	<5.0	<2.0	<2.0	
	Feb-93	<2.0	<10	7.0		12	<2.0	16	<2.0				<2.0	34	16	<2.0	22		<10	<2.0	<2.0	<10	<2.0	<2.0	
DEC-205O	Sep-92	<2.0	<5.0	<2.0		<2.0	<2.0	30	<2.0				<2.0	24	<2.0	<2.0	8.0		<5.0	<2.0	<2.0	<5.0	<2.0	<2.0	
	Feb-93	<2.0	<10	<2.0		<2.0	<2.0	85	<2.0				<2.0	21	160	<2.0	4.0		<10	<2.0	<2.0	<10	<2.0	<2.0	
	Nov-94	<5.0	<5.0	<5.0		<5.0	295	<5.0	<5.0				<5.0	<5.0	<5.0	<5.0	<5.0		<5.0	<5.0	<5.0		<5.0	<5.0	
GZ-501L	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	7.0	<1.0	<1.0	8.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	8.0	<1.0	<1.0	9.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	11	<1.0	<1.0	16	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	9.0	<1.0	<1.0	14	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	12	<1.0	0.36J	19	<1.0	<1.0	<1.0	0.14J	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	24	<1.0	0.4 J	35	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	24	<1.0	0.40J	33	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	4.3	<1.0	<1.0	6.9	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	3.5	<1.0	0.25J	5.2	<1.0	<1.0	<1.0	<1.0	<2.0
GZ-501U	Mar-00	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	1.0	<1.0	5.0	<1.0	<1.0	39	<1.0	<1.0	<1.0	<1.0	<2.0
	Aug-00	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	3.0	<1.0	<1.0	27	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	3.0	<1.0	<1.0	25	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	30	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	0.9J	<1.0	0.4J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	31	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	0.66J	<1.0	0.23J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	20	<1.0	<1.0	<1.0	0.16J	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	0.84 J	<1.0	0.18 J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	3.0	<1.0	<1.0	30	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	0.66J	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.3	<1.0	<1.0	26	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	0.54	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	24	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	0.33J	<1.0	0.13J	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	15	<1.0	<1.0	<1.0	<1.0	<2.0
GZ-502L	Mar-00	<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	16	<1.0	<1.0	15	<1.0	<1.0	<1.0	<1.0	<2.0
	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	33	<1.0	<1.0	32		<1.0	<1.0	<1.0	<1.0
	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	46	<1.0	1.0	47	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	75	<3.0	<3.0	65	<3.0	<3.0	<3.0	<3.0	<3.0
	Mar-01	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	<3.0			<12	<3.0	<3.0	<3.0	140	<3.0	<3.0	130	<3.0	<3.0	<3.0	<3.0	<3.0
	Jun-01	<5.0	<5.0	4.0J	<5.0	<5.0	<5.0	<5.0	6.0	<5.0			<25	<5.0	<5.0	<5.0	210	<5.0	<5.0	170	<5.0	<5.0	<5.0	<5.0	<10
	Sep-01	<1.0	<1.0	1.0	<1.0	0.44J	<1.0	0.5J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	220	<1.0	0.73J	200	<1.0	<1.0	<1.0	2.0	<2.0
	Dec-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	9.9	<5.0			<25	<5.0	<5.0	<5.0	200	<5.0	<5.0	180	<5.0	<5.0	<5.0	1.3 J	<5.0
	Mar-02	<5.0	<5.0	3.6JB	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	170	<5.0	<5.0	180	<5.0	<5.0	<5.0	1.7J	<5.0

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
	Jun-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.8JB	<25	<5.0	<5.0	<5.0	100	<5.0	<5.0	110	<5.0	<5.0	<5.0	<5.0	<10
	Sep-02	<2.5	<2.5	<2.5	0.68JB	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	40	<2.5	<2.5	52	<2.5	<2.5	<2.5	<2.5	<5
GZ-503L	Mar-00	<1.0	<1.0	15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	30	<1.0	1.0	35	<1.0	<1.0	<1.0	<1.0	<2.0
	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	77	<1.0	<1.0	68		<1.0	<1.0	<1.0	<1.0
	Aug-00	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<1.2	<2.5	<2.5	<2.5	91	<2.5	<2.5	78	<2.5	<2.5	<2.5	<2.5	<1.0
	Dec-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	84	<5.0	<5.0	67	<5.0	<5.0	<5.0	<5.0	<5.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	45	<1.0	<1.0	42	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	29	<1.0	<1.0	19	<1.0	<1.0	<1.0	0.19J	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	33	<1.0	<1.0	20	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	21	<1.0	<1.0	13	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	70	<2.5	<2.5	61	<2.5	<2.5	<2.5	<2.5	<5.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	0.2J	<1.0	0.21J	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	100	<1.0	0.87J	100	<1.0	<1.0	<1.0	1.2	<2.0
GZ-503U	Aug-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	<5.0	<5.0	9.0	210	<5.0	<5.0	<5.0	<5.0	<1.0
	Dec-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	<5.0	<5.0	8.0	200	<5.0	<5.0	<5.0	<5.0	<5.0
	Jun-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	1.0J	<5.0	<5.0	210	<5.0	<5.0	<5.0	<5.0	<10
	Sep-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	1.5J	<5.0	<5.0	190	<5.0	<5.0	<5.0	1.4J	<10
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.21JB	<1.0	0.22JB	<5.0	<1.0	<1.0	<1.0	0.67J	<1.0	<1.0	66	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	1.4	<1.0	0.34J	120	<1.0	<1.0	<1.0	1.8	<2.0
GZ-504U	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0
GZ-504L	Aug-00	<1.0	<1.0	6.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.19J	<1.0	<1.0	0.48J	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.14J	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	2.8	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	2.3	<1.0	<1.0	3.1	<1.0	<1.0	<1.0	<1.0	<2.0
GZ-504R	Aug-00	<1.0	<1.0	3.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.7J	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	5.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	0.65 J	<2.5	<2.5	3.3	<2.5	<2.5	<2.5	<2.5	<2.5
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.64J	<1.0	<1.0	2.8	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	0.13J	<1.0	<1.0	0.66J	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	0.68J	<1.0	<1.0	5.2	<1.0	<1.0	<1.0	<1.0	<2.0
GZ-505R	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	3.0	<1.0	<1.0	0.5J	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	0.5J	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.15J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
GZ-505U	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.0	<1.0	8.0	74J	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	0.39J	<1.0	3.2	18	<1.0	<1.0	<1.0	<1.0	<2.0

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
GZ-505L	Sep-00	<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	7.0	<1.0	<1.0	24	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	9.0	<3.0	<3.0	100	<3.0	<3.0	<3.0	<3.0	<3.0
	Mar-01	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	7.0	<3.0	<3.0	79	<3.0	<3.0	<3.0	<3.0	<3.0
	Jun-01	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	4.0	<3.0	<3.0	89	<3.0	<3.0	<3.0	<3.0	<3.0
	Sep-01	<3.0	<3.0	<3.0	0.86J	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	7.0	<3.0	2.2J	130	<3.0	<3.0	<3.0	0.48J	<5.0
	Dec-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	6.4	<5.0	<5.0	130	<5.0	<5.0	<5.0	<5.0	<5.0
	Mar-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	6.0	<5.0	<5.0	100	<5.0	<5.0	<5.0	<5.0	<5.0
	Jun-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<25	<5.0	<5.0	<5.0	3.8J	<5.0	<5.0	98	<5.0	<5.0	<5.0	<5.0	<10
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	0.11J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
GZ-506R	Jun-00	<1.0	<1.0	8.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Aug-00	<1.0	<1.0	8.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	7.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Oct-00	<1.0	<10	8.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<10	<1.0	<1.0	<1.0	5.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	9.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	8.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	7.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0			0.6J	<1.0	<1.0	<1.0	23	<1.0	<1.0	0.4J	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	6.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0			0.5J	<1.0	<1.0	<1.0	10	<1.0	<1.0	0.24J	0.13J	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	8.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	5.7B	<1.0	<1.0	<1.0	2.6	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	29	<1.0	<1.0	0.56J	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	4.6	<1.0	<1.0	<1.0	2.3	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	24	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	4.1B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	26	<1.0	<1.0	0.53J	<1.0	<1.0	<1.0	<1.0	<2.0
GZ-506U	Jun-00	<1.0	<1.0	5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Aug-00	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	0.76J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.54J	<1.0	<1.0	0.12J	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	2.6	0.44 J	<1.0	0.61 J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	5.1	<1.0	<1.0	9.3	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	1.4B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	2.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	1.4B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	0.23J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
GZ-507L	Jun-02			2.5		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
	Sep-02			1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
GZ-507R	Mar-02			<1.0		<1.0	<1.0	<1.0									15		<1.0	<1.0				<1.0	
	Jun-02			<1.0		<1.0	<1.0	1.3									33		<1.0	<1.0				<1.0	
	Sep-02			<1.0		<1.0	<1.0	<1.0									25		<1.0	0.11J				<1.0	
GZ-508L	Mar-02			20		<1.0	<1.0	<1.0									15		<1.0	<1.0				<1.0	
	Jun-02			4.2		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
	Sep-02			1.4		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
GZ-508R	Mar-02			<1.0		<1.0	<1.0	<1.0									14		<1.0	1.1				<1.0	
	Jun-02			<1.0		<1.0	<1.0	<1.0									16		<1.0	<1.0				<1.0	
	Sep-02			<1.0		<1.0	<1.0	<1.0									9.7		<1.0	0.83J				<1.0	
GZ-509L	Mar-02			1.1		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
	Jun-02			<1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
	Sep-02			<1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
GZ-509R	Mar-02			<1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
	Jun-02			<1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
	Sep-02			<1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
GZ-510L	Mar-02			1.6		<1.0	<1.0	0.018J									59		<1.0	8.8				<1.0	
	Jun-02			1.7		<1.0	<1.0	<1.0									60		<1.0	8.0				<1.0	
	Sep-02			<2.5		<2.5	<2.5	<2.5									43		<2.5	5.4				<2.5	

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
GZ-510R	Mar-02			<1.0		<1.0	0.087J	<1.0									1.3		0.14J	16				0.015J	
	Jun-02			<5.0		<5.0	<5.0	<5.0									110		<5.0	9.2				<5.0	
	Sep-02			<1.0		0.16J	<1.0	<1.0									14		0.23J	16				<1.0	
GZ-511U	Aug-00	<1.0	<1.0	5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	45	<1.0	<1.0	22	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	120	<5.0	7.0	65	<5.0	<5.0	<5.0	<5.0	<5.0
	Mar-01	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	71	<3.0	<3.0	38	<3.0	<3.0	<3.0	<3.0	<3.0
	Jun-01	<1.0	<1.0	6.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	54	<1.0	<1.0	19	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	3.0	<1.0	<1.0	<1.0	0.44J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	33	<1.0	0.27J	12	<1.0	<1.0	<1.0	0.48J	<2.0
	Dec-01	<1.0	<1.0	7.5	<1.0	<1.0	<1.0	0.68 J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	72 E	<1.0	0.82 J	35	<1.0	<1.0	<1.0	1.2	<1.0
	Mar-02	<1.0	<1.0	5.1B	<1.0	0.35J	<1.0	1.6J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	70	<1.0	<1.0	31	<1.0	<1.0	<1.0	1.4J	<1.0
	Jun-02	< 2.5	< 2.5	7.2	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 12	< 2.5	< 2.5	< 2.5	20	< 2.5	< 2.5	8.4	< 2.5	< 2.5	< 2.5	< 2.5	<5.0
	Sep-02	< 1.0	< 1.0	3.2	< 1.0	0.41J	< 1.0	1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	45	< 1.0	1.2	25	< 1.0	< 1.0	< 1.0	1.2	<2.0
GZ-512L	Mar-02			10		<1.0	0.022J	<1.0									0.062J		<1.0	<1.0				<1.0	
	Jun-02			1.9		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
	Sep-02			<1.0		<1.0	<1.0	<1.0									<1.0			<1.0				<1.0	
GZ-512R	Mar-02			1.4		0.26J	<1.0	0.74J									42		0.95J	7.4				0.017J	
	Jun-02			<1.0		<1.0	<1.0	2.8									40		<1.0	4.9				<1.0	
	Sep-02			<1.0		0.96J	<1.0	3.3									15		0.76J	16				<1.0	
GZ-513L	Mar-02			6.1		<1.0	<1.0	<1.0									<1.0		0.024J	<1.0				<1.0	
	Jun-02			<1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
	Sep-02			<1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
GZ-513R	Mar-02			3.1		<1.0	<1.0	<1.0									0.023J		<1.0	<1.0				<1.0	
	Jun-02			<1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
	Sep-02			<1.0		<1.0	<1.0	<1.0									<1.0		<1.0	<1.0				<1.0	
GZ-515U	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.44J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
GZ-516U	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
GZ-519U	Nov-00	<3.0	<3.0	4.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0			<12	<3.0	<3.0	<3.0	85	<3.0	<3.0	34	<3.0	<3.0	<3.0	<3.0	<3.0
	Dec-00	<3.0	<3.0	7.0	<3.0	<3.0	<3.0	3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	120	<3.0	<3.0	47	<3.0	<3.0	<3.0	<3.0	<3.0
	Mar-01	<3.0	<3.0	4.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	71	<3.0	<3.0	25	<3.0	<3.0	<3.0	<3.0	<3.0
	Jun-01	<3.0	<3.0	3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	67	<3.0	<3.0	20	<3.0	<3.0	<3.0	<3.0	<5.0
	Sep-01	<3.0	<3.0	3.0	<3.0	0.64J	<3.0	1.5J	<3.0	<3.0			<12	<3.0	<3.0	<3.0	89	<3.0	<3.0	32	<3.0	<3.0	<3.0	1.2J	<5.0
	Dec-01	<2.5	<2.5	3.6	<2.5	0.5 J	<2.5	1.3 J	4.7	<2.5			<12	<2.5	<2.5	<2.5	84	<2.5	<2.5	32	<2.5	<2.5	<2.5	0.98 J	<2.5
	Mar-02	<2.5	<2.5	4.3B	<2.5	<2.5	<2.5	1.5J	<2.5	<2.5			<12	<2.5	<2.5	<2.5	79	<2.5	<2.5	29	<2.5	<2.5	<2.5	0.89J	<2.5
	Jun-02	< 2.5	< 2.5	6.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 12	< 2.5	< 2.5	< 2.5	69	< 2.5	< 2.5	22	< 2.5	< 2.5	< 2.5	0.32J	<5.0
	Sep-02	< 2.5	< 2.5	8.5B	0.7JB	0.4J	< 2.5	1J	< 2.5	< 2.5	< 2.5	< 2.5	3.6JB	< 2.5	< 2.5	< 2.5	65	< 2.5	< 2.5	27	< 2.5	< 2.5	< 2.5	1.1J	<5
OW-1	Feb-93	<2.0	<10	<2.0		<2.0	<2.0	<2.0	<2.0				<2.0	<2.0	<2.0	<2.0	<2.0		<10	<2.0	<2.0	<1.0	<2.0	<2.0	

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
OW-2	Sep-92	<2.0	<5.0	<2.0		3.0	<2.0	2.0	<2.0				<2.0	<2.0	<2.0	<2.0	8.0		<5.0	5.0	<2.0	<5.0	<2.0	<2.0	
	Feb-93	<2.0	<10	<2.0		4.0	<2.0	3.0	<2.0				<2.0	<2.0	<2.0	<2.0	13		<10	6.0	<2.0	<10	<2.0	<2.0	
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.15J	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.22 JB			<5.0	<1.0	<1.0	<1.0	0.20 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.69J	<1.0	<1.0	0.46J	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	0.12J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
OW-101	Aug-00	<50	<50	<50	<50	<50	<50	<50	<50	<50			<250	<50	<50	<50	3,300	<50	<50	1,700	<50	<50	<50	100	<50
	Dec-00	<100	<100	<100	<100	<100	<100	<100	<100	<100			<500	<100	<100	<100	2,700	<100	<100	1,400	<100	<100	<100	<100	<100
	Mar-01	<100	<100	<100	<100	<100	<100	<100	160	<100			<500	<100	<100	<100	3,300	<100	<100	1,600	<100	<100	<100	<100	<100
	Jun-01	<100	<100	54J	<100	<100	<100	<100	<100	<100			<500	<100	<100	<100	3,400	<100	<100	960	<100	<100	<100	58J	<200
	Sep-01	<100	<100	<100	<100	<100	<100	15J	<100	<100			<500	<100	<100	<100	5,800	<100	<100	2,800	<100	<100	<100	130	<200
	Dec-01	<250	<250	<250	<250	<250	<250	<250	<250	<250			<1,200	<250	<250	<250	3,500	<250	<250	1,500	<250	<250	<250	66J	<250
	Mar-02	<250	<250	140JB	<250	<250	<250	<250	<250	<250			<1,200	<250	<250	<250	3,200	<250	<250	<250	<250	<250	<250	41J	<250
	Jun-02	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 1200	< 250	< 250	< 250	3,300	< 250	< 250	1,300	< 250	< 250	< 250	54J	<500
	Sep-02	< 250	< 250	240JB	68JB	< 250	< 250	< 250	< 250	< 250	< 250	< 250	530JB	< 250	< 250	< 250	2400	< 250	< 250	1100	< 250	< 250	< 250	97J	<500
OW-102	Oct-00	<1.0	<10	18	<10	<1.0	<1.0	<1.0	<1.0	<1.0			<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.0	<10	<10	<1.0	<1.0
	Dec-00	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	7.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.16J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.32 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	1.3B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	1.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	2.7B	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
OW-103	Sep-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	21	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	2.3	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	4.6	<1.0	<1.0	9.6	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	0.4J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	4.0	<1.0	<1.0	8.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	0.48J	<1.0	1.0	0.3J	<1.0	0.46J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	3.0	<1.0	<1.0	7.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.32 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	0.49J	<1.0	<1.0	0.63J	<1.0	1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	7.5	<1.0	<1.0	10	<1.0	<1.0	<1.0	0.16J	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	0.19J	< 1.0	0.27J	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	3.5	< 1.0	< 1.0	5.2	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	0.3J	< 1	0.9JB	0.38J	< 1.0	0.38J	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	4	< 1.0	< 1.0	6.6	< 1.0	< 1.0	< 1.0	0.092J	<2.0
OW-105	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.8J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.49J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	0.30J	<1.0	0.22J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	0.16J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
OW-106	Sep-92	<2.0	<5.0	<2.0		2.0	<2.0	<2.0	<2.0				<2.0	<2.0	<2.0	<2.0	4.0		<5.0	8.0	<2.0	<5.0	<2.0	<2.0	
	Feb-93	<2.0	<10	<2.0		3.0	<2.0	<4.0	<2.0				<2.0	<2.0	<2.0	<2.0	10		<10	22	<2.0	<10	<2.0	<2.0	
	Feb-93(DUP)	<2.0	<10	<2.0		3.0	<2.0	<4.0	<2.0				<2.0	<2.0	<2.0	<2.0	9.0		<10	22	<2.0	<10	<2.0	<2.0	
	Nov-94	<5.0	<5.0	<5.0		<5.0	<5.0	<5.0	<5.0				<5.0	<5.0	<5.0	<5.0	<5.0		<5.0	21	<5.0		<5.0	<5.0	

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
OW-301	Sep-92	<2.0	<5.0	<2.0		<2.0	<2.0	<2.0	<2.0				<2.0	<2.0	<2.0	<2.0	<2.0		<5.0	<2.0	<2.0	<5.0	<2.0	<2.0	
	Mar-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	
	Sep-01	<1.0	<1.0	0.32J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.54J	<1.0	<1.0	0.11J	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	1.0B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	0.96JB	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
OW-302	Sep-92	<2.0	<5.0	2.0		<2.0	<2.0	<2.0	<2.0				<2.0	2.0	<2.0	<2.0	49		<5.0	7.0	<2.0	<5.0	<2.0	<2.0	
	Feb-93	<2.0	<10	<2.0		<2.0	<2.0	<2.0	<2.0				<2.0	3.0	<2.0	<2.0	50		<10	45	<2.0	<10	<2.0	<2.0	
OW-303A	Aug-00	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<1.0	<1.0	<10	<1.0	4.0	<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	18	<1.0	<1.0	6.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	4.0	<1.0	<1.0	3.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	6.0	<1.0	<1.0	5.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-01	<1.0	<1.0	0.37J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	5.0	<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	6.5	<1.0	<1.0	4.1	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	3.2	<1.0	<1.0	3.8	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	3.1	< 1.0	< 1.0	2.5	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	3	< 1.0	< 1.0	4	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
OW-304U	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	3.0	<1.0	3.0	12	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	4.0	<1.0	0.4J	<1.0	<1.0	0.7J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	4.0	<1.0	<1.0	0.22J	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	4.0	<1.0	0.77J	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	1.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	1.4	< 1.0	< 1.0	4.9	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	2.8	< 1.0	0.24JB	0.13J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	1.1	< 1.0	1.0	5.6	< 1.0	0.2J	< 1.0	< 1.0	<2.0
OW-304L	Aug-00	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000			<5,000	<1,000	<1,000	<1,000	52,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
	Dec-00	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000			<5,000	<1,000	<1,000	<1,000	28,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
	Mar-01	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000			<5,000	<1,000	<1,000	<1,000	46,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
	Jun-01	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000			<5,000	<1,000	<1,000	<1,000	54,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<2,000
	Sep-01	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	310J	<1,000	<1,000			<5,000	<1,000	<1,000	<1,000	35,000	<1,000	<1,000	730J	<1,000	<1,000	<1,000	<1,000	<2,000
	Dec-01	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	1,700	<1,000			<5,000	<1,000	<1,000	<1,000	29,000	<1,000	<1,000	670J	<1,000	<1,000	<1,000	<1,000	<1,000
	Mar-02	<1,000	<1,000	580JB	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000			<5,000	<1,000	<1,000	<1,000	37,000	<1,000	<1,000	560J	<1,000	<1,000	<1,000	<1,000	<1,000
	Jun-02	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	410JB	< 1000	340JB	< 5000	< 1000	< 1000	< 1000	35,000	< 1000	< 1000	290J	< 1000	< 1000	< 1000	< 1000	<2000
	Sep-02	< 1000	< 1000	< 1000	290JB	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	3100JB	920J	< 1000	< 1000	25000	< 1000	< 1000	1400	< 1000	< 1000	< 1000	< 1000	<2000
OW-304R	Jun-00	<100	<100	<100	<100	<100	<100	<100	<100	<100			<500	<100	<100	<100	6,200	<100	<100	240		<100	<100	<100	
	Aug-00	<100	<100	<100	<100	<100	<100	<100	<100	<100			<500	<100	<100	<100	5,100	<100	<100	200	<100	<100	<100	<100	<100
	Oct-00	<20	<200	<20	<200	<20	<20	<20	<20	<20			<200	<20	<20	<20	2,200	<20	<20	88	<20	<200	<200	<20	<20
	Dec-00	<1.0	<1.0	4.0	10	<1.0	16	8.0	<1.0	<1.0			<5.0	10	<1.0	3.0	6,000	<1.0	47	72J	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<250	<250	<250	<250	<250	<250	<250	<250	<250			<1,200	<250	<250	<250	5,100	<250	<250	<250	<250	<250	<250	<250	<250
	Jun-01	<100	<100	<100	<100	<100	<100	<100	<100	<100			<500	<100	<100	<100	5,900	<100	<100	160	<100	<100	<100	<100	<200
	Sep-01	<100	<100	<100	<100	<100	<100	68J	<100	<100			<500	<100	<100	<100	4,500	<100	100	140	<100	<100	<100	<100	<200
	Dec-01	<250	<250	<250	<250	<250	<250	<250	<250	<250			<1,200	<250	<250	<250	9,100	<250	90J	380	<250	<250	<250	<250	<250
	Mar-02	<250	<250	110JB	<250	<250	<250	<250	<250	<250			<1,200	<250	<250	<250	3,400	<250	<250	190J	<250	<250	<250	<250	<250
	Jun-02	< 250	< 250	< 250	23JB	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 1200	< 250	< 250	< 250	5,800	< 250	< 250	130J	< 250	16JB	< 250	< 250	<500
	Sep-02	< 250	< 250	< 250	93JB	< 250	< 250	< 250	< 250	< 250	< 250	< 250	540JB	< 250	< 250	< 250	4,500	< 250	75J	1100	< 250	< 250	< 250	< 250	<500
OW-305	Mar-98	<50	<50	<50	<100	<50	<50	<50	<50	<50				<50	<50	<50	1,700	<100	360	1,000	<50	<100	<50	<50	
	Jun-98	<40	<40	<40	<80	<40	<40	<40	<40	<40				<40	<40	<40	350	<80	81	150	<40	<80	<40	<40	
	Oct-98	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	200	<2.5	51	130	<2.5	<2.5	<2.5	6.0	
	Dec-98	<10	<10	<10	<10	<10	<10	<10	<10	<10			<50	<10	<10	<10	350	<10	77	220	<10	<10	<10	<10	

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
	Mar-99	<25	<25	<25	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	1,600	<25	250	1,100		<25	<50	58	<25
	Jul-99	<25	<25	<25	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	1,600	<25	800	990		<25	<25	<25	<25
	Sep-99	<50	<50	<50	<50	<50	<50	<50	<50	<50			<250	<50	<50	<50	210	<50	29	140		<50	<50	<50	<50
	Oct-99	<50	<50	<50	<50	<50	<50	<50	<50	<50			<250	<50	<50	<50	290	<50	51	200		<50	<50	6.0	<50
	Dec-99	<25	<25	<25	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	1,400	<25	390	970		<25	<25	<25	<25
OW-305I	Mar-00	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.0
	Jun-00	<25	<25	<25	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	960	<25	750	1,300		<25	<25	25	
	Aug-00	<25	<25	6.0	<25	<25	<25	<25	<25	<25			13	<25	<25	<25	480	<25	350	1,100	<25	<25	<25	13	<25
	Dec-00	<50	<50	<50	<50	<50	<50	<50	<50	<50			<250	<50	<50	<50	690	<50	260	900	<50	<50	<50	<50	<50
	Mar-01	<50	<50	<50	<50	<50	<50	<50	<50	<50			<250	<50	<50	<50	1,000	<50	260	1,300	<50	<50	<50	<50	<50
	Jun-01	<25	<25	<25	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	420	<25	220	870	<25	<25	<25	<25	<50
	Sep-01	<25	<25	<25	<25	<25	<25	1.4J	<25	<25			<120	<25	<25	<25	1,200	<25	160	1,300	<25	<25	<25	19J	<50
	Dec-01	<25	<25	<25	<25	<25	<25	<25	48	<25			<120	<25	<25	<25	870	<25	250	1,100	<25	<25	<25	17 J	<25
	Mar-02	<25	<25	20JB	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	420	<25	290	930	<25	<25	<25	16J	<25
	Jun-02	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 120	< 25	< 25	< 25	730	< 25	180	910	< 25	< 25	< 25	< 11	<50
	Sep-02	< 25	< 25	< 25	6.8JB	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 120	< 25	< 25	< 25	630	< 25	140	700	< 25	< 25	< 25	14J	<50
OW-305U	Mar-00	<25	<25	<25	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	160	<25	370	1,600	<25	<25	<25	<25	<2.0
	Sep-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.7	0.22J	<1.0	0.17J	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.23J	0.17J	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.39J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
OW-307	Feb-96	<3.0	<2.0	19		<2.0	<3.0	<4.0					<8.0	<1.0	<1.0	<1.0	175		<5.0	71	<3.0	<2.0	<3.0	<3.0	
	May-96	<0.5	<0.5	44	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	<0.5	<0.5	<0.5	180	<0.5	<0.5	130	<0.5	<0.5	<0.5	2.2	
	Aug-96	<0.5	<0.5	10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	<0.5	<0.5	<0.5	180	<0.5	<0.5	160	2.4	<0.5	<0.5	3.8	
	Sep-00	<25	<25	<25	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	1,100	<25	<25	690	<25	<25	<25	<25	<25
	Feb-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	82	<5.0	<5.0	130	<5.0	<5.0	<5.0	<5.0	
	Jun-01	<25	<25	<25	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	290	<25	<25	440	<25	<25	<25	<25	<50
	Sep-01	<5.0	<5.0	5.2	<5.0	0.38J	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	160	<5.0	<5.0	250	<5.0	<5.0	<5.0	11	<10
	Dec-01	<5.0	<5.0	6.7	<5.0	<5.0	<5.0	<5.0	10.0	<5.0			<25	<5.0	<5.0	<5.0	180	<5.0	6.7	260	<5.0	<5.0	<5.0	1.7J	<5.0
	Jun-02	<25	< 25	<25	<25	<25	<25	<25	<25	<25	<25	<25	< 120	<25	<25	<25	530	< 25	< 25	540	<25	2.2J	<25	2.5J	<50
OW-401	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	33	<1.0	1.5	25	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	36	<1.0	1.3	32	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	53	<3.0	<3.0	52	<3.0	<3.0	<3.0	<3.0	<3.0
	Jun-01	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	60	<2.5	<2.5	67	<2.5	<2.5	<2.5	<2.5	<5.0
	Sep-01	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	77	<3.0	0.87J	83	<2.5	<2.5	<2.5	0.59J	<5.0
	Dec-01	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	130	<2.5	<2.5	130	<2.5	<2.5	<2.5	<2.5	<2.5
	Mar-02	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	52	<2.5	<2.5	55	<2.5	<2.5	<2.5	<2.5	<2.5
	Jun-02	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 12	< 2.5	< 2.5	< 2.5	27	< 2.5	< 2.5	31	< 2.5	< 2.5	< 2.5	< 2.5	<5.0
	Sep-02	< 2.5	< 2.5	< 2.5	0.73JB	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	3.6JB	< 2.5	< 2.5	< 2.5	26	< 2.5	0.89J	33	< 2.5	< 2.5	< 2.5	< 2.5	<5
OW-402L	Feb-93	<20	<100	<20		<20	<20	<20	<20				<20	<20	<20	<20	230		100	100	<20	<100	<20	<20	
	Oct-00	<1.0	<1.0	19	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.2	<1.0	<1.0	<1.0	<1.0
	Sep-02	< 1.0	< 1.0	< 1.0	3.4B	< 1.0	< 1.0	1.6	5.5	< 1.0	0.31J	< 1.0	< 5	0.78J	< 1.0	< 1.0	62	< 1.0	< 1.0	0.73J	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
OW-402U	Feb-93	<20	<100	<20		<20	<20	<20	<20				<20	30	<20	<20	310		<100	60	<20	<100	<20	<20	
	Aug-00	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	2.9	<2.5	<2.5			<12	<2.5	<2.5	<2.5	38	<2.5	<2.5	82	<2.5	<2.5	<2.5	<2.5	<2.5
	Mar-01	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	83	<2.5	<2.5	81	<2.5	<2.5	<2.5	3.0	<2.5

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
	Sep-01	<2.5	<2.5	<2.5	<2.5	0.66J	<2.5	1.8J	<2.5	<2.5			<12	<2.5	<2.5	<2.5	71	<2.5	<2.5	90	<2.5	<2.5	<2.5	3.0	<5.0
	Dec-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.3 J	<5.0	<5.0			<25	<5.0	<5.0	<5.0	110	<5.0	<5.0	140	<5.0	<5.0	<5.0	2.3 J	<5.0
OW-402R	Jan-01	<1.0	<1.0	3.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0			7.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	12	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	2.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	180	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<25	<25	12J	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	470	<25	<25	3.6J	<25	<25	<25	<25	<50
	Mar-02	<5.0	<5.0	2.8JB	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	140	<5.0	<5.0	2.8J	<5.0	<5.0	<5.0	<5.0	<5.0
	Jun-02	<10	<10	<10	1.1JB	<10	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	310	<10	<10	4.3J	<10	1JB	<10	<10	<20
	Sep-02	<10	<10	<10	6.4JB	0.4J	<10	<10	<10	<10	<10	<10	25JB	0.38J	<10	<10	410	<10	<10	21	<10	4.1J	<10	<10	<20
OW-403L	Aug-00	<250	<250	<250	<250	<250	<25	<250	<250	<250			1,600	<250	<250	<250	24,000	<250	<250	600	<250	<250	<250	<250	<250
	Dec-00	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000			<5,000	<1,000	<1,000	<1,000	26,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
	Mar-01	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000			<5,000	<1,000	<1,000	<1,000	23,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
	Jun-01	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000			<5,000	<1,000	<1,000	<1,000	21,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<2,000
	Sep-01	<500	<500	<500	<500	<500	67J	100J	<500	<500			<2,500	<500	<500	<500	17,000	<500	<500	190J	<500	<500	<500	<500	<1,000
	Dec-01	<500	<500	<500	<500	<500	<500	<500	1,100	<500			<2,500	<500	<500	<500	24,000	<500	<500	200 J	<500	<500	<500	<500	<500
	Mar-02	<500	<500	280JB	<500	<500	<500	<500	<500	<500			<2,500	<500	<500	<500	18,000	<500	<500	110J	<500	<500	<500	<500	<500
	Jun-02	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<2500	<500	<500	<500	16,000	<500	<500	<500	<500	44JB	<500	<500	<1000
	Sep-02	<500	<500	<500	200JB	<500	<500	<500	<500	<500	<500	<500	1500JB	220J	<500	<500	13000	<500	<500	310J	<500	<500	<500	<500	<1000
OW-404L	Oct-00	<1.0	<10	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0			<10	<1.0	<1.0	<1.0	16	<1.0	<1.0	13	<1.0	<10	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	58	<1.0	<1.0	57	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	49	<1.0	<1.0	45	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	32	<1.0	<1.0	24	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	31	<1.0	<1.0	30	<1.0	<1.0	<1.0	0.19J	<2.0
	Dec-01	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	16	<2.5	<2.5	15	<2.5	<2.5	<2.5	<2.5	<2.5
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	44	<1.0	<1.0	42	<1.0	<1.0	<1.0	0.19J	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	30	<1.0	<1.0	32	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	29	<1.0	<1.0	30	<1.0	<1.0	<1.0	0.13J	<2.0
OW-404R	Aug-00	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	93	<2.5	<2.5	17	<2.5	<2.5	<2.5	<2.5	<2.5
	Oct-00	<1.0	<10	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0			<10	<1.0	<1.0	<1.0	58	<1.0	<1.0	57	<1.0	<10	<10	<1.0	<1.0
	Dec-00	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	110	<3.0	<3.0	140	<3.0	<3.0	<3.0	<3.0	<3.0
	Mar-01	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	95	<3.0	<3.0	130	<3.0	<3.0	<3.0	<3.0	<3.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.4J	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	0.84J	<1.0	0.47J	<1.0	0.37J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	190	<1.0	0.27J	220	<1.0	<1.0	<1.0	3.7	<2.0
	Dec-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25.0	<5.0	<5.0	<5.0	230	<5.0	<5.0	280	<5.0	<5.0	<5.0	1.1 J	<5.0
	Mar-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	110	<5.0	<5.0	150	<5.0	<5.0	<5.0	<5.0	<5.0
	Jun-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<25	<5.0	<5.0	<5.0	200	<5.0	<5.0	230	<5.0	<5.0	<5.0	0.79J	<10
	Sep-02	<5	<5	<5	1.5JB	<5	<5	<5	<5	<5	<5	<5	<25	<5	<5	<5	170	<5	<5	210	<5	<5	<5	1.6J	<10
OW-404U	Oct-00	<1.0	<10	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0			<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	31	<1.0	<1.0	26	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
OW-405	Feb-93	<2.0	<10	<2.0		<2.0	<2.0	<2.0	<2.0				<2.0	<2.0	<2.0	<2.0	60		<10	<2.0	<2.0	<10	<2.0	<2.0	
OW-406	Nov-94	<5.0	<5.0	<5.0		<5.0	<5.0	<5.0	<5.0				<5.0	<5.0	<5.0	<5.0	<5.0		<5.0	15	<5.0		<5.0	<5.0	
	Mar-00	<1.0	<1.0	7.0	9.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	1.2	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	1.3B	1.4B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	0.62J	<1.0	<1.0	0.3J	<1.0	<1.0	<1.0	<1.0	0.22J	<1.0	<1.0	<2.0

TABLE 1

Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
OW-407	Feb-93	<2.0	<10	<2.0		<2.0	<2.0	<2.0	<2.0				<2.0	<2.0	<2.0	<2.0	<2.0		<10	<2.0	<2.0	<10	<2.0	<2.0	
	Sep-01	<1.0	<1.0	0.54J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	0.26JB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
OW-408	Feb-93	<20	<10	<20		<20	<20	<20	<20				<20	<20	<20	<20	770		<10	170	<20	<10	<20	<20	
	Dec-00	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	17	<3.0	<3.0	80	<3.0	<3.0	<3.0	4.0	<3.0
	Jun-02	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	96	<2.5	<2.5	19	<2.5	<2.5	<2.5	1.4J	<5.0
W-1	Aug-00	<1.0	<1.0	<1.0	39	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	42	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	57	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	14	<1.0	1.0	7.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	59	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	30	<1.0	<1.0	9.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<5.0	<5.0	3.1J	52	<5.0	<5.0	<5.0	<5.0	<5.0			2.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	54	<5.0	<0.5	<10
	Sep-01	<1.0	<1.0	0.43J	61	<1.0	<1.0	0.32J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.74J	0.19J	0.36J	0.5J	<1.0	1.0	<1.0	<1.0	<2.0
	Dec-01	<2.5	<2.5	<2.5	110	<2.5	<2.5	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
	Mar-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.54J	<5.0	1.5J	<5.0	<5.0	<5.0
	Jun-02	<5.0	<5.0	<5.0	33	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	4.2J	<5.0	<5.0	<10
W-3	Sep-92	<2.0	<5.0	<2.0		<2.0	<2.0	<2.0	<2.0				<2.0	<2.0	<2.0	<2.0	<2.0		<5.0	<2.0	<2.0	<5.0	<2.0	<2.0	
	Feb-93	<2.0	<10	<2.0		<2.0	<2.0	<2.0	<2.0				<2.0	<2.0	<2.0	<2.0	<2.0		<2.0	<2.0	<2.0	<10	<2.0	<2.0	
	Nov-94	<5.0	<5.0	128		70	<5.0	<5.0	<5.0				<5.0	<5.0	<5.0	<5.0	<5.0		<5.0	<5.0	<5.0		<5.0	<5.0	
	Mar-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	
	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
W-4	Feb-93	<2.0	<10	<2.0		<2.0	<2.0	<2.0	<2.0				<2.0	<2.0	<2.0	<2.0	<2.0		<2.0	<2.0	<2.0	<10	<2.0	<2.0	
	Nov-94	<5.0	<5.0	<5.0		<5.0	<5.0	<5.0	<5.0				<5.0	<5.0	<5.0	<5.0	<5.0		<5.0	19	<5.0		<5.0	<5.0	
	Mar-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	
	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	24-Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
W-5	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
	Dec-00	<1.0	<1.0	18	1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	27	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	1.0J	30	<1.0	<1.0	0.5J	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.1J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	2.0	5.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.42J	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	2.3	9.2	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.88 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	11B	34	<1.0	<1.0	1.2	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.64J	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	12	<1.0	<1.0	0.2J	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.71J	<1.0	<1.0	<2.0
	Sep-02	<1.0	<1.0	1.7	19B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.23JB	<5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
W-6	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	10	<1.0	<1.0	24		<1.0	<1.0	<1.0	
	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	12	<1.0	<1.0	24	<1.0	<1.0	<1.0	1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	10	<1.0	<1.0	17	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	14	<1.0	<1.0	21	<1.0	<1.0	<1.0	1.0	<1.0
	Jun-01	<3.0	<3.0	0.6J	0.9J	<3.0	<3.0	<3.0	<3.0	<3.0			<12	<3.0	<3.0	<3.0	50	<3.0	<3.0	24	<3.0	<3.0	<3.0	<3.0	<5.0
	Sep-01	<2.5	<2.5	<2.5	4.0	<2.5	0.49J	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	90	<2.5	<2.5	31	<2.5	<2.5	<2.5	1.4J	<5.0
	Dec-01	<2.5	<2.5	<2.5	6.2	<2.5	0.48 J	<2.5	<2.5	<2.5			<12	<2.5	<2.5	<2.5	93	<2.5	<2.5	71	<2.5	<2.5	<2.5	1.1 J	<2.5
	Mar-02	<2.5	<2.5	<2.5	<2.5	<2.5	0.12J	0.39J	8.4	<2.5			0.30J	<2.5	<2.5	<2.5	110	<2.5	<2.5	51	<2.5	0.41J	<2.5	1.3J	<2.5
	Jun-02	<2.5	<2.5	<2.5	2.4J	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	80	<2.5	<2.5	45	<2.5	0.6J	<2.5	0.43J	<5.0

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
W-7	Mar-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	1.0		<1.0	<1.0	<1.0	<1.0
	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	1.0		<1.0	<1.0	<1.0	
	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	5.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.7J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.61JB			<5.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	0.3J	<1.0	0.24J	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	2.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.25JB			<1.0	<1.0	<1.0	<1.0	0.15J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.4JB	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	0.27J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
WB-1L	Oct-00	<5.0	<50	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0			<50	<5.0	<5.0	<5.0	340	<5.0	<50	290	<5.0	<50	<50	<5.0	<5.0
	Dec-00	<10	<10	<10	<10	<10	<10	<10	<10	<10			<50	<10	<10	<10	570	<10	<10	480	<10	<10	<10	<10	<10
	Mar-01	<10	<10	<10	<10	<10	<10	<10	<1.0	<10			<50	<10	<10	<10	300	<10	<10	290	<10	<10	<10	<10	<10
	Jun-01	<10	<10	6J	<10	<10	<10	<10	<10	<10			<50	<50	<10	<10	280	<10	<10	250	<10	<10	<10	<10	<20
	Sep-01	<10	<10	<10	<10	<10	<10	<10	<10	<10			<50	<10	<10	<10	450	<10	<10	480	<10	<10	<10	8.5J	<20
	Dec-01	<25	<25	<25	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	650	<25	<25	530	<25	<25	<25	<25	<25
	Mar-02	<25	<25	18JB	<25	<25	<25	<25	<25	<25			<120	<25	<25	<25	510	<25	<25	410	<25	<25	<25	<25	<25
	Jun-02	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 120	< 25	< 25	< 25	270	< 25	< 25	220	< 25	< 25	< 25	< 25	<50
	Sep-02	<10	<10	< 10	3JB	< 10	< 10	< 10	< 10	< 10	< 10	< 10	<50	< 10	< 10	< 10	280	< 10	< 10	280	< 10	< 10	< 10	< 6	<20
WB-1U	Mar-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	32	<1.0	<1.0	39	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	29	<1.0	<1.0	31	<1.0	<1.0	<1.0	<1.0	<1.0
	Oct-00	<1.0	<10	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0			<10	<1.0	<1.0	<1.0	36	<1.0	<10	28	<1.0	<10	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	21	<1.0	<1.0	14	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	11	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	6.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	29	<1.0	<1.0	7.1	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	0.87JB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	38	<1.0	<1.0	35	<1.0	<1.0	<1.0	0.14J	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	1.8	< 1.0	< 1.0	0.54J	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	20	< 1.0	< 1.0	30	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
WB-2L	Dec-99	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	<1.0
	Mar-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.7J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	0.9J	<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.43JB	< 1.0	< 5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
WB-2U	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	8.0	<1.0	<1.0	3.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0

TABLE 1
Summary of Groundwater Testing Results (ug/L)
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION	SAMPLE DATE	Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1 Dichloroethane (DCA)	1,2 Dichloroethane	1,1 Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1 Trichloroethane (TCA)	1,1,2 Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	Bromodichloromethane	Chloromethane	Dibromochloromethane	trans-1,2 Dichloroethylene	1,3-Dichloropropene (total)
WB-3L	Dec-99	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	<1.0
	Mar-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	
	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2
WB-4L	Dec-99	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	<1.0
	Mar-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	
	Aug-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Sep-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
	Dec-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0
	Sep-02	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<2.0

TABLE 1
Summary of Groundwater Testing Results, ug/l
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

NOTES:

1. Blank cells indicate either historical data was unavailable or analyte was not tested for.

2. "NT" indicates analyte not tested for.

3. All units are micrograms per liter (ug/L).

4. "J" indicates the concentration reported was at or below the reporting limit.

5. "B" indicates the analyte in question was detected in the associated laboratory blank.

6. "E" indicates the reported value exceeds the calibration range.

7. "<" indicates the compound was not detected above the method quantification limit shown.

8. Boldface values reflect detected analytes.

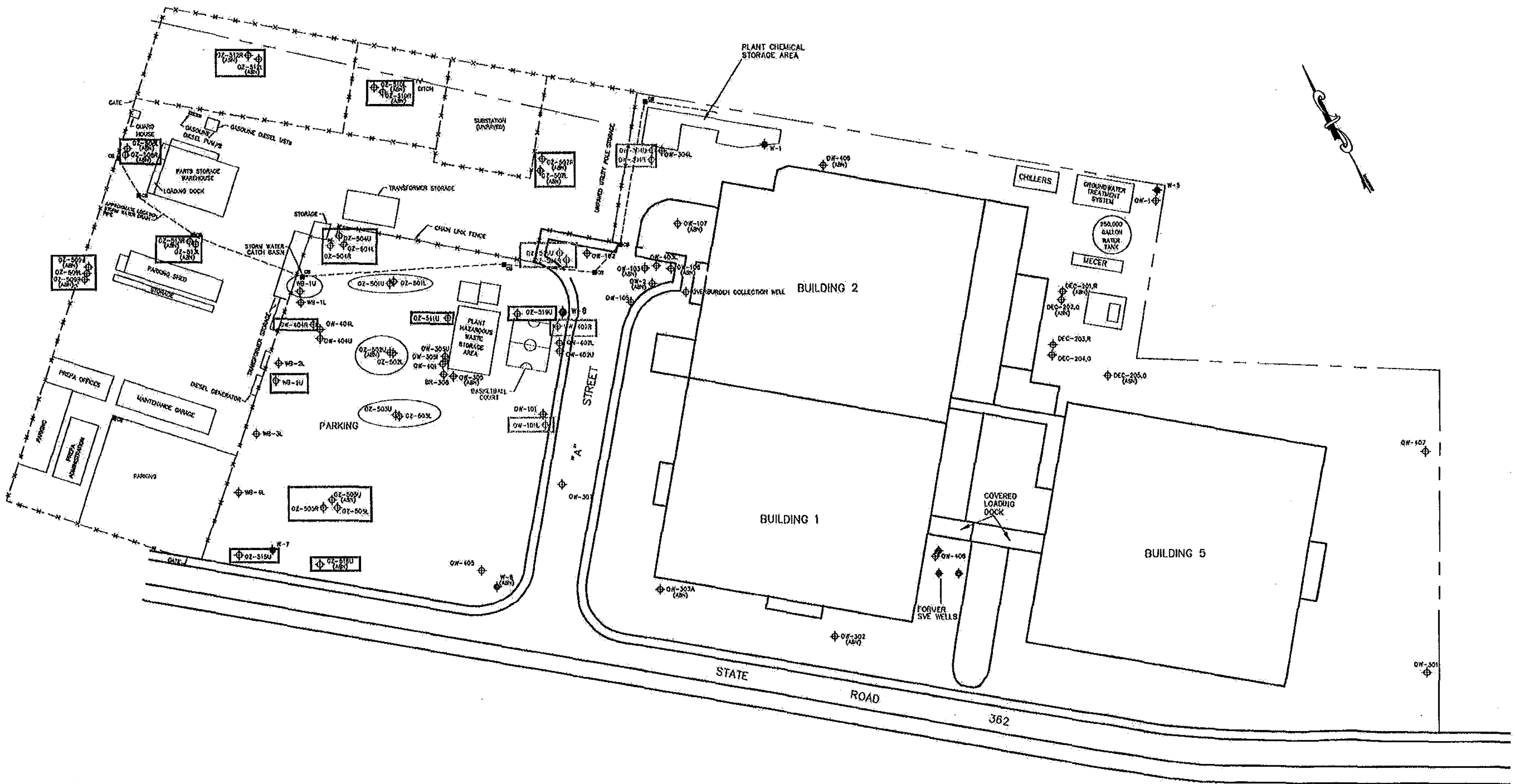
9. OW-105 was incorrectly named OW-5 on the chain of custody from the September 2002 sampling round. Data shown as OW-105 for the September 2002 round was taken from the data reported as OW-5

10. Data shown in most cases is limited to the last nine rounds of historical chemical data for presentation purposes. Historical chemical data prior to the last nine rounds is presented in previous progress reports. Specific analytes shown represent those with positive detections considering all historic sampling rounds.

A-2

2007 Hewlett Packard Semi-Annual Project Progress Report

July 2007 (Q3) – December 2007 (Q4)



NOTES:

1. BASE MAP WAS DEVELOPED FROM THE FOLLOWING TWO PLANS:
   (A) PLAN PROVIDED BY PEDRO PANZARDI & ASSOCIATES ENTITLED "SITE PLAN WITH ELEVATIONS OF SEWER SYSTEM," SHEET NO. 3 OF 7, PROJECT NO. 6811, DWG. NO. 10-1.1, DATED 3/11/68, ORIGINAL SCALE: 1:500 OR 1" = 41'.
   (B) PLAN PROVIDED BY DIGITAL EQUIPMENT CORPORATION (DEC), SAN GERMAN, PUERTO RICO, ENTITLED "PLAN & PROFILE" DRAWN BY VELAZQUES, DATED 1/23/87, ORIGINAL SCALE: 1:500 OR 1" = 41'.
2. THE LOCATIONS OF TEST BORINGS/WELLS WERE DETERMINED BY TAPE MEASURES AND "LINE-OF-SIGHT" OBSERVATIONS FROM EXISTING SITE FEATURES. THESE DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND

W-5	BEDROCK EXTRACTION WELL LOCATION
"U"	INDICATES MONITOR WELL SCREENED IN FILL/ALLUVIUM
"L"	INDICATES MONITOR WELL SCREENED IN SAPROLITE
"R"	INDICATES MONITOR WELL SCREENED IN BEDROCK
	SVE WELLS
"ABN"	INDICATES WELL HAS BEEN ABANDONED
OW-404L	EXISTING MONITOR WELLS
GZ-501U GZ-501L	PHASE I HYDROGEOLOGIC INVESTIGATION WELLS
WB-2U OW-304U	PHASE II HYDROGEOLOGIC INVESTIGATION WELLS
WB-2U	PHASE III HYDROGEOLOGIC INVESTIGATION WELLS
GZ-516U	PHASE IV HYDROGEOLOGIC INVESTIGATION WELLS

PAVED PARKING

REV. NO.	DESCRIPTION	BY	DATE

GRAPHIC SCALE: 1" = 60'
0 30' 60' 120'

GZA GeoEnvironmental, Inc.
Engineers and Scientists
380 HARVEY ROAD
MANCHESTER, NEW HAMPSHIRE 03103

PROJ. MGR: MBA
DESIGNED BY: ATD
REVIEWED BY: MJB
DRAWN BY: BJC
SCALE: AS SHOWN
DATE: JAN 2008

PROJECT PROGRESS REPORT - JULY 2007 (Q3) THROUGH DECEMBER 2007 (Q4)
HEWLETT-PACKARD VOLUNTARY REMEDIATION PROJECT
SAN GERMAN, PUERTO RICO

WELL LOCATIONS AND SITE FEATURES

PROJECT NO.
24065.02

FIGURE NO.
1

TABLE 2
SUMMARY OF GROUNDWATER TESTING RESULTS (µg/L)

Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION AND DATE		Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1-Dichloroethane (DCA)	1,2-Dichloroethane	1,1-Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1-Trichloroethane (TCA)	1,1,2-Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2-Dichloroethene (DCE)	Chloromethane	Dibromochloromethane	trans-1,2-Dichloroethylene	1,3-Dichloropropene (total)
Overburden Groundwater Standards		NB	NB	17,000	NB	29,000,000	50,000	2,500	NB	NB	NB	NB	157,500,000	111,000	NB	41,000	11,000	NB	4,600	3,500,000	NB	NB	14,600,000	NB
Bedrock Groundwater Standards		NB	NB	237,000	NB	30,000,000	3,800,000	3,500	NB	NB	NB	NB	24,000,000	17,000	NB	3	26	NB	10	8,700	NB	NB	2,200,000	NB
BR-308	Mar-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Mar-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-502L	Mar-06	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	11	<10	<10	16.0	<10	<10	<10	<10
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0		<1.0	<1.0	1.2	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.59J*	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0*	<1.0	50*	<1.0	1.3	79.0	<1.0	<1.0	1.0J	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	0.30 J	<1.0	0.70 J	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	73	<1.0	1.1	91.0	<1.0	<1.0	1.0	<1.0
GZ-504U	Mar-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Mar-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-504R	Mar-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.51J	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	0.87 J	<1.0	<1.0	8.8	<1.0	<1.0	<1.0	<1.0
GZ-505L	Mar-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	2	<1.0	0.84	52	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.8	<1.0	1.6	47	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	42	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	0.92 J	<1.0	1.3	35	<1.0	<1.0	<1.0	<1.0
GZ-505R	Mar-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	0.42	<1.0	<1.0	0.24 J	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.8	<1.0	1.6	47	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GZ-506R	Mar-06	<1.0	<1.0	0.37 JB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	3.7	<1.0	<1.0	2.3 H	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	0.18 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	15	<1.0	<1.0	1.9	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.45J	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	77	<1.0	<1.0	4.3	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	0.24 J	<1.0	0.67 J	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	77	<1.0	<1.0	4.7	<1.0	<1.0	<1.0	<1.0
GZ-515U	Mar-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
OW-1	Mar-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Mar-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OW-101	Mar-06	<50	<50	7.6 JB	<50	<50	<50	<50	<50	<50	<50	<50	<250	<50	<50	<50	2,600	<50	<50	940 H	<50	<50	68	<50
	Sep-06	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<250	<50	<50	<50	2,200	<50	<50	1,200	<50	<50	140	<50
	Mar-07	<50*	<50	<50	<50*	<50	<50	<50	<50	<50	<50	<50	<250	<50	<50*	<50	1,500	<50	<50	990	<50	<50	60	<50
	Sep-07	<20	<20	<20	<20	<20	<20	11 J	<20	<20	<20	<20	<100	<20	<20	<20	900	<20	<20	560	<20	<20	120	<20
OW-301	Mar-06	<1.0	<1.0	0.34 JB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	0.23 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

TABLE 2
SUMMARY OF GROUNDWATER TESTING RESULTS (µg/L)

Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION AND DATE		Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1-Dichloroethane (DCA)	1,2-Dichloroethane	1,1-Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1-Trichloroethane (TCA)	1,1,2-Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2-Dichloroethene (DCE)	Chloromethane	Dibromochloromethane	trans-1,2-Dichloroethylene	1,3-Dichloropropene (total)
Overburden Groundwater Standards		NB	NB	17,000	NB	29,000,000	50,000	2,500	NB	NB	NB	NB	157,500,000	111,000	NB	41,000	11,000	NB	4,600	3,500,000	NB	NB	14,600,000	NB
Bedrock Groundwater Standards		NB	NB	237,000	NB	30,000,000	3,800,000	3,500	NB	NB	NB	NB	24,000,000	17,000	NB	3	26	NB	10	8,700	NB	NB	2,200,000	NB
OW-304L	Mar-06	<1000	<1000	210 JB	<1000	<1000	<1000 *	<1000	<1000	<1000	<1000	<1000	240 J	<1000	<1000	<1000	16,000	<1000	<1000	910 JH	<1000	<1000	<1000	<1000
	Sep-06	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<1300	<250	<250	<250	16,000	<250	<250	740	<250	<250	<250	<250
	Mar-07	<250 *	<250	<250	<250	<250	72J	<250	<250	<250	<250	<250	57JB	<250	<250*	<250	14,000	<250	76J	1000	<250	<250	<250	<250
	Sep-07	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<1300	<250	<250	<250	8,500	<250	<250	580	<250	<250	<250	<250
	Sep-07 (DUP)	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<1300	<250	<250	<250	13,000	<250	<250	780	<250	<250	<250	<250
OW-304R	Mar-06	<1000	<1000	170 JB	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<5000	<1000	<1000	<1000	15,000	<1000	<1000	350 JH	<1000	<1000	<1000	<1000
	Sep-06	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<250	<50	<50	<50	1,500	<50	52	360	<50	<50	<50	<50
	Sep-06 DUP	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<250	<50	<50	<50	1,500	<50	48 J	330	<50	<50	<50	<50
	Mar-07	<50*	<50	<50	<50*	<50	<50	<50	<50	<50	<50	<50	<250	<50	<50*	<50	1,300	<50	41J	310	<50	<50	<50	<50
	Mar-07 (DUP)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	4.5 JB	<20	<20	<20*	1,200	<20	32	250	<20	<20	<20	<20
	Sep-07	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<250	<50	<50	<50	1,100	<50	20	190	<50	<50	<50	<50
OW-305I	Mar-06	<10	<10	<10	<10	<10	<10	<10	<10	10	<10	<10	<50	<10	<10	<10	390	<10	170	580	<10	<10	16	<10
	Sep-06	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	360	<10	140	460	<10	<10	13	<10
	Mar-07	<10	<10	<10	<10	1.8 J	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	300	<10	270	890	<10	<10	22	<10
	Sep-07	<10	<10	1.5 JB	<10	<10	<10	1.8 J	<10	<10	<10	<10	<50	<10	<10	<10	87	<10	110	270	<10	<10	11	<10
OW-404U	Mar-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
OW-404L	Mar-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	7.8	<1.0	<1.0	11	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	9.3	<1.0	<1.0	18	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	6.4	<1.0	<1.0	13	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	3.8	<1.0	<1.0	9.7	<1.0	<1.0	<1.0	<1.0
OW-404R	Mar-06	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	2.8 J	<10	<10	<10	38	<10	<10	90	<10	<10	<10	<10
	Mar-06 (DUP)	<10	<10	1.7 JB	<10	<10	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	41	<10	<10	91	<10	<10	<10	<10
	Sep-06	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	130	<10	<10	140	<10	<10	<10	<10
	Mar-07	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	97 JB	<5.0	<5.0*	<5.0	27	<5.0	<5.0	86	<5.0	<5.0	<5.0	<5.0
	Sep-07	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<25	<5.0	<5.0	<5.0	95	<5.0	<5.0	130	<5.0	<5.0	1.8 J	<5.0
OW-405	Mar-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Mar-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OW-408	Mar-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Mar-07	<10	<10	<10	<10	<10	<10	15	<10	<10	<10	<10	<50	<10	<10	<10*	630	<10	610	690	<10	<10	98	<10
	Sep-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W-7	Mar-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1	<1.0	<1.0	0.71 JH	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	0.56 J	<1.0	<1.0	0.39 J	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	0.54J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W-8	Mar-06	<2.0	<2.0	<2.0	3.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.55 J	<2.0	<2.0	<2.0	42	<2.0	<2.0	36	<2.0	<2.0	0.77 JH	<0.2
	Sep-06	<1.0	<1.0	<1.0	7.7	0.34 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	50	<1.0	<1.0	58	<1.0	<1.0	1.5	<1.0
	Mar-07	<1.0	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	61	<1.0	<1.0	47	<1.0	<1.0	1.1	<1.0
	Sep-07	<1.0	<1.0	<1.0	5.4	0.34 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	16	<1.0	<1.0	45	<1.0	<1.0	0.93 J	<1.0

TABLE 2
SUMMARY OF GROUNDWATER TESTING RESULTS (µg/L)

Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION AND DATE		Carbon tetrachloride	Chloroethane	Chloroform	Dichlorodifluoromethane	1,1-Dichloroethane (DCA)	1,2-Dichloroethane	1,1-Dichloroethene	1,2-Dichloropropane	1,2-Dichlorobenzene	1,3-Dichlorobenzene
Overburden Groundwater Standards		NB	NB	17,000	NB	29,000,000	50,000	2,500	NB	NB	NB
Bedrock Groundwater Standards		NB	NB	237,000	NB	30,000,000	3,800,000	3,500	NB	NB	NB
WB-1U	Mar-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
WB-1L	Mar-06	<50	<50	**7.8 JB**	<50	<50	<50	<50	<50	<50	<50
	Sep-06	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Mar-07	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Sep-07	<1.0	<1.0	**0.62 J**	<1.0	**0.45 J**	<1.0	**0.47 J**	<1.0	<1.0	<1.0
WB-2L	Mar-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WB-4L	Mar-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

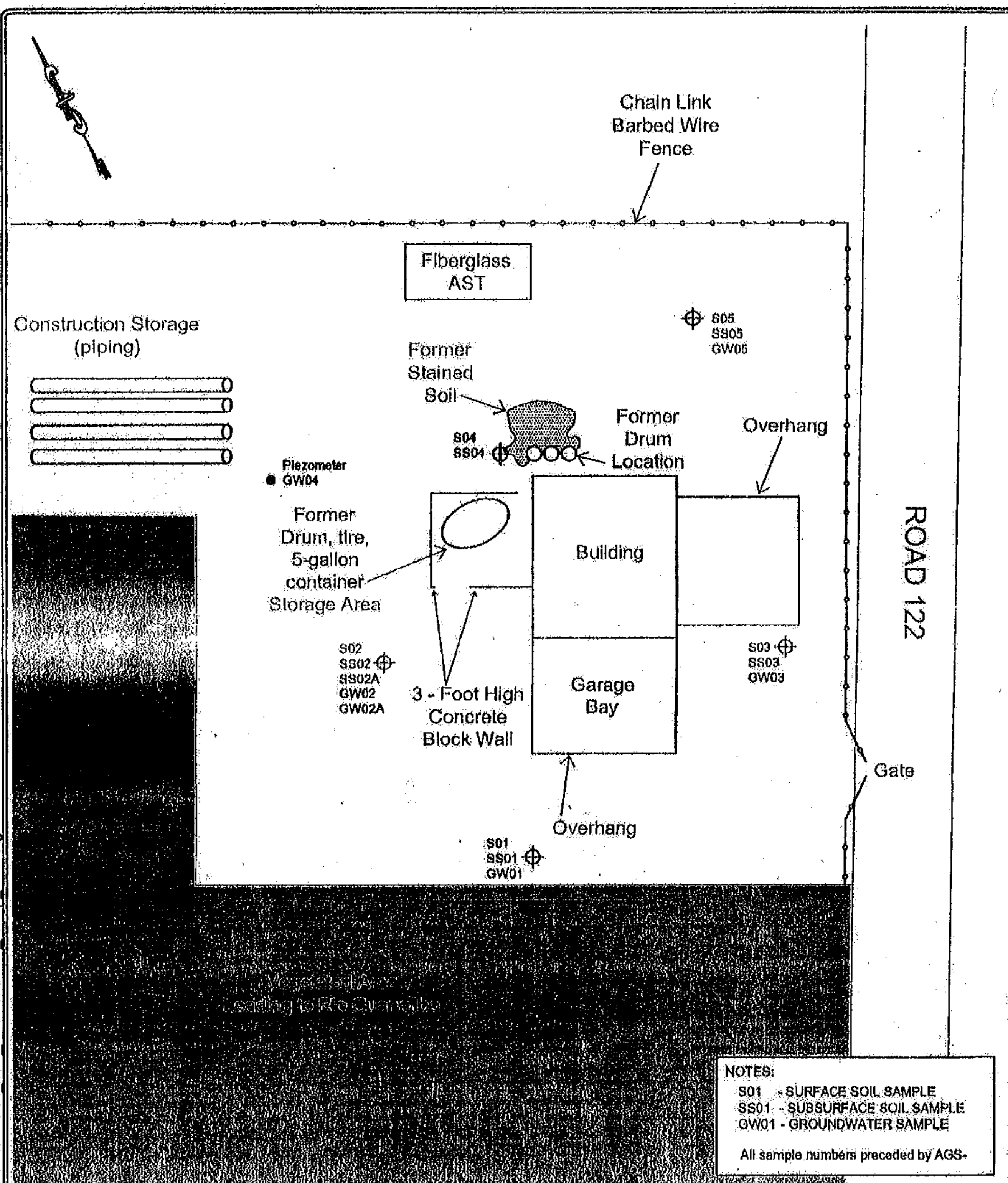
SAMPLE LOCATION AND DATE		1,4-Dichlorobenzene	Methylene chloride	Tetrachloroethene (PCE)	1,1,1-Trichloroethane (TCA)	1,1,2-Trichloroethane	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl chloride	cis-1,2-Dichloroethene (DCE)	Chloromethane	Dibromochloromethane	trans-1,2-Dichloroethylene	1,3-Dichloropropene (total)
Overburden Groundwater Standards		NB	157,500,000	111,000	NB	41,000	11,000	NB	1,600	3,500,000	NB	NB	14,600,000	NB
Bedrock Groundwater Standards		NB	24,000,000	17,000	NB	3	26	NB	10	8,700	NB	NB	2,200,000	NB
WB-1U	Mar-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-06	<1.0	<5.0	<1.0	<1.0	<1.0	**36**	<1.0	<1.0	**40**	<1.0	<1.0	**0.52 J**	<1.0
	Mar-07	<1.0	<5.0	<1.0	<1.0	<1.0	**9.7**	<1.0	<1.0	**9.3**	<1.0	<1.0	<1.0	<1.0
	Sep-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
WB-1L	Mar-06	<50	**13 J**	<50	<50	<50	**130**	<50	<50	**130**	<50	<50	<50	<50
	Sep-06	<5.0	<25	<5.0	<5.0	<5.0	**180**	<5.0	<5.0	**170**	<5.0	<5.0	**9.7**	<5.0
	Mar-07	<5.0*	**0.99 JB**	<5.0	<5.0	<5.0	**130**	<5.0	<5.0	**240**	<5.0	<5.0*	**2.9 J**	<5.0
	Sep-07	<1.0	<5.0	<1.0	<1.0	<1.0	**130**	<1.0	**0.69 J**	**170**	**0.11 J**	<1.0	**2.9**	<1.0
WB-2L	Mar-06	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-06	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WB-4L	Mar-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-06	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Mar-07	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-07	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:

1. Blank cells indicate either historical data was unavailable or analyte was not tested for.
2. "NT" indicates analyte not tested for.
3. All units are micrograms per liter (µg/L).
4. "J" indicates the concentration reported was at or below the reporting limit.
5. "B" indicates the analyte in question was detected in the associated laboratory blank.
6. "E" indicates the reported value exceeds the calibration range.
7. "<" indicates the compound was not detected above the method quantification limit shown.
8. Boldface values reflect detected analytes.
9. Shading indicates the reference concentration exceeds the applicable Media Protection Standards.
10. "NB" Indicates no groundwater quality standard established.

A-3

2007 Abandoned Gulf Preliminary Assessment/Site Inspection



LEGEND:

Not to scale

● - PIEZOMETER LOCATION

⊕ - BORING LOCATION

TITLE:

SAMPLE LOCATION MAP

Abandoned Gulf Station
San German, Puerto Rico

CLIENT NAME: EPA

WESTON

DATE: Jan 31 2007

FIGURE #: 2

P:\EPA\San_German\GIS\CAD\0107_Gulf_Station\04048_Samp_Loc.dwg

Abandoned Gulf Station
Volatile Organic Compounds (VOC) Soil Results - January 25, 2007
Case No. 36111

SAT 2 Sample No:	AGS-S01	AGS-SS01	AGS-S02	AGS-SS02	AGS-SS02A	AGS-S03	AGS-SS03	AGS-S04	AGS-SS04	AGS-S05	AGS-SS05
EPA Sample No.	B3S24	B3S35	B3S27	B3S28	B3S29	B3S32	B3S33	B3S35	B3S36	B3S38	B3S39
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Unit	UG/KG	UG/KG	UG/KG	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Sample Depth	0.5-1.0 ft	29.5-30 ft	0.5-1.0 ft	22-25 ft	22-25 ft	0.5-1.0 ft	21.5-22.5 ft	0.5-1.0 ft	29-29.5 ft	0.5-1.0 ft	29.5-30 ft
										Background	Background
Dichlorodifluoromethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Chloromethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Vinyl Chloride	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Bromomethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Chloroethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Trichlorofluoromethane	1.3 J	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,1-Dichloroethene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Acetone	12 U	8.5 U	11 U	10 U	9.9 U	12 U	12 U	13 U	19	11 U	10 U
Carbon Disulfide	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Methyl Acetate	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Methylene Chloride	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
trans-1,2-Dichloroethene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Methyl-tert-butyl ether	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,1-Dichloroethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
cis-1,2-Dichloroethene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
2-Butanone	12 U	8.5 U	11 U	10 U	9.9 U	12 U	12 U	13 U	13 U	11 U	10 U
Bromochloromethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Chloroform	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,1,1-Trichloroethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Cyclohexane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Carbon Tetrachloride	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Benzene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,2-Dichloroethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,4-Dioxane	120 R	85 R	110 R	100 R	99 R	120 R	120 R	130 R	130 R	110 R	100 R
Trichloroethene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Methylcyclohexane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,2-Dichloropropane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Bromodichloromethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
cis-1,3-Dichloropropene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
4-Methyl-2-Pentanone	12 U	8.5 U	11 U	10 U	9.9 U	12 U	12 U	13 U	13 U	11 U	10 U
Toluene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	1.2 J
trans-1,3-Dichloropropene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,1,2-Trichloroethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Tetrachloroethene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
2-Hexanone	12 U	8.5 U	11 U	10 U	9.9 U	12 U	12 U	13 U	13 U	11 U	10 U
Dibromochloromethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,2-Dibromoethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Chlorobenzene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Ethylbenzene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	1.1 J
m,p-Xylene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	4.8 J
o-Xylene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	1.2 J
Styrene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Bromoform	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
Isopropylbenzene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,1,2,2-Tetrachloroethane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,3-Dichlorobenzene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,4-Dichlorobenzene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,2-Dichlorobenzene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,2-Dibromo-3-Chloropropane	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,2,4-Trichlorobenzene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U
1,2,3-Trichlorobenzene	5.9 U	4.3 U	5.5 U	5.2 U	5.0 U	5.8 U	5.8 U	6.6 U	6.7 U	5.7 U	5.2 U

ug/kg - micrograms per kilogram
U - Contaminant not detected
UJ - Contaminant not detected
R - Rejected
J - Estimated concentration
Note - sample depths presented in feet below ground surface
Shading indicates a positive detection

141

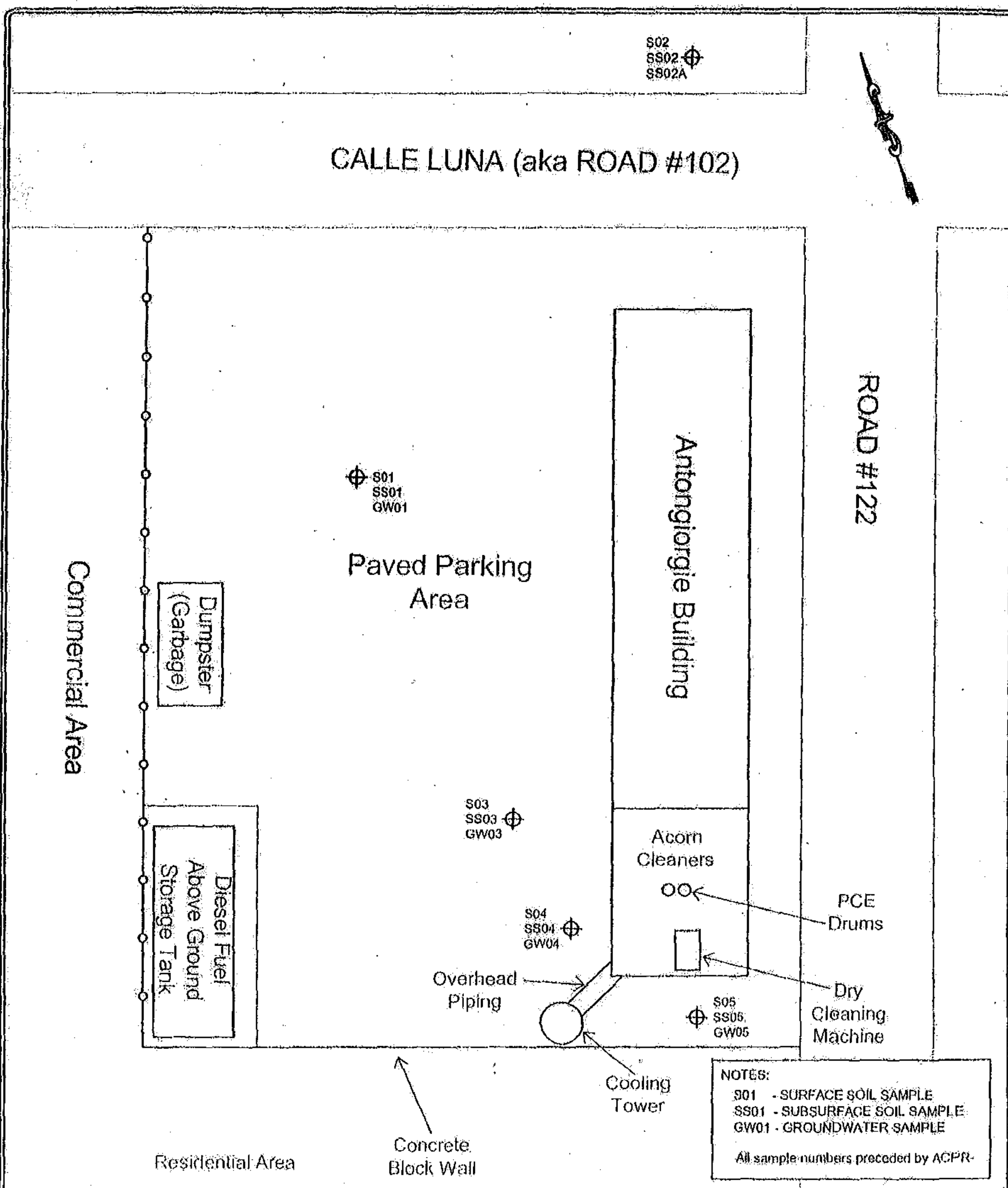
Abandoned Gulf Station
Volatile Organic Compound (VOC) Groundwater Results - January 25, 2007
Case No. 36111

SAT 2 Sample No.	AGS-GW01	AGS-GW02	AGS-GW02A	AGS-GW03	AGS-GW04	AGS-GW05	AGS-RIN01	AGS-TB01
EPA Sample No.	B3S26	B3S30	B3S31	B3S34	B3S37	B3S40	B3S41	B3S42
Matrix	Water	Water	Water	Water	Water	Water	Water	Water
Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Sample Depth	30 ft	25 ft	25 ft	30 ft	30 ft	30 ft	NA	NA
						Background	Field Blank	Trip Blank
Dichlorodifluoromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichlorofluoromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl Acetate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene Chloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl-tert-butyl ether	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone	10 U	10 U	10 U	14	10 U	10 U	10 U	10 U
Bromochloromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.8 J	2.8 J
1,1,1-Trichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cyclohexane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon Tetrachloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dioxane	100 R	100 R	100 R	100 R	100 R	100 R	100 R	100 R
Trichloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylcyclohexane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	10 U	10 U	10 U	2.8 J	10 U	10 U	10 U	10 U
Dibromochloromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-Chloropropane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

ug/L - micrograms per liter
U - Contaminant not detected
UJ - Contaminant not detected
R - Rejected
J - Estimated concentration
Note - sample depths presented in feet below ground surface
Shading indicates a positive detection

A-4

2007 Acorn Dry Cleaners Preliminary Assessment/Site Inspection



LEGEND: Not to scale

⊕ - BORING LOCATION

TITLE: SAMPLE LOCATION MAP

PROJECT: Acorn Cleaners
San German, Puerto Rico

CLIENT NAME: EPA

WESTON

DATE: Feb 02 2007

FIGURE #: 2

P:\EPA\San German\GIS\CAD\0107_Acorn_Cleaners\04049_Samp_Loc.dwg

Acorn Cleaners
Volatile Organic Compound (VOC) Soil Results - January 26, 2007
Case No. 36112

SAT 2 Sample No.	ACPR-S01	ACPR-SS01	ACPR-S02	ACPR-SS02	ACPR-SS02A	ACPR-S03	ACPR-SS03	ACPR-S04	ACPR-SS04	ACPR-S05	ACPR-SS05
EPA Sample No.	B3RZ4	B3RZ5	B3RZ7	B3RZ8	B3RZ9	B3S02	B3S03	B3S05	B3S06	B3S08	B3S09
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Unit	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Sample Depth	0.5-1.0 ft	14-15 ft	0.5-1.0 ft	13-14 ft	13-14 ft	0.5-1.0 ft	6.5-7 ft	0.5-1.0 ft	12-13.5 ft	0.5-1.0 ft	15-16 ft
Comment					Duplicate					Background	Background
Dichlorodifluoromethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Chloromethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Vinyl Chloride	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Bromomethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Chloroethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Trichlorofluoromethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,1-Dichloroethene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Acetone	15 U	12 U	11 U	11 U	11 U	28	10 U	19 U	14 U	13 U	12 U
Carbon Disulfide	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Methyl Acetate	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Methylene Chloride	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
trans-1,2-Dichloroethene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Methyl-tert-butyl ether	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,1-Dichloroethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
cis-1,2-Dichloroethene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
2-Butanone	14 U	12 U	11 U	11 U	11 U	14 U	10 U	12 U	13 U	13 U	12 U
Bromochloromethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Chloroform	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,1,1-Trichloroethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Cyclohexane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Carbon Tetrachloride	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Benzene	6.8 U	5.8 U	5.7 U	5.7 U	5.5 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,2-Dichloroethane	6.8 U	5.6 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,4-Dioxane	140 R	120 R	110 R	110 R	110 R	140 R	100 R	130 R	130 R	130 R	130 R
Trichloroethene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Methylcyclohexane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,2-Dichloropropane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Bromodichloromethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
cis-1,3-Dichloropropene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 UJ	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
4-Methyl-2-Pentanone	14 U	12 U	11 U	11 U	11 U	14 U	10 U	12 U	13 U	13 U	12 U
Toluene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
trans-1,3-Dichloropropene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 UJ	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,1,2-Trichloroethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 UJ	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Tetrachloroethene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	3.1 J	6.2 U
2-Hexanone	14 U	12 U	11 U	11 U	11 U	14 UJ	10 U	12 U	13 U	13 U	12 U
Dibromochloromethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,2-Dibromoethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Chlorobenzene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 UJ	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Ethylbenzene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
m,p-Xylene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
o-Xylene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Styrene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Bromoform	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
Isopropylbenzene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,1,2,2-Tetrachloroethane	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,3-Dichlorobenzene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 UJ	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,4-Dichlorobenzene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 UJ	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,2-Dichlorobenzene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 UJ	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,2-Dibromo-3-Chloropropane	6.8 U	5.5 U	5.7 U	5.7 U	5.6 U	7.2 U	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,2,4-Trichlorobenzene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 UJ	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U
1,2,3-Trichlorobenzene	6.8 U	5.8 U	5.7 U	5.7 U	5.6 U	7.2 UJ	5.1 U	6.2 U	6.4 U	6.4 U	6.2 U

ug/kg - micrograms per kilogram
U - Contaminant not detected
UJ - Contaminant not detected
R - Rejected
J - Estimated concentration
Note: Sample depths presented in feet below ground surface

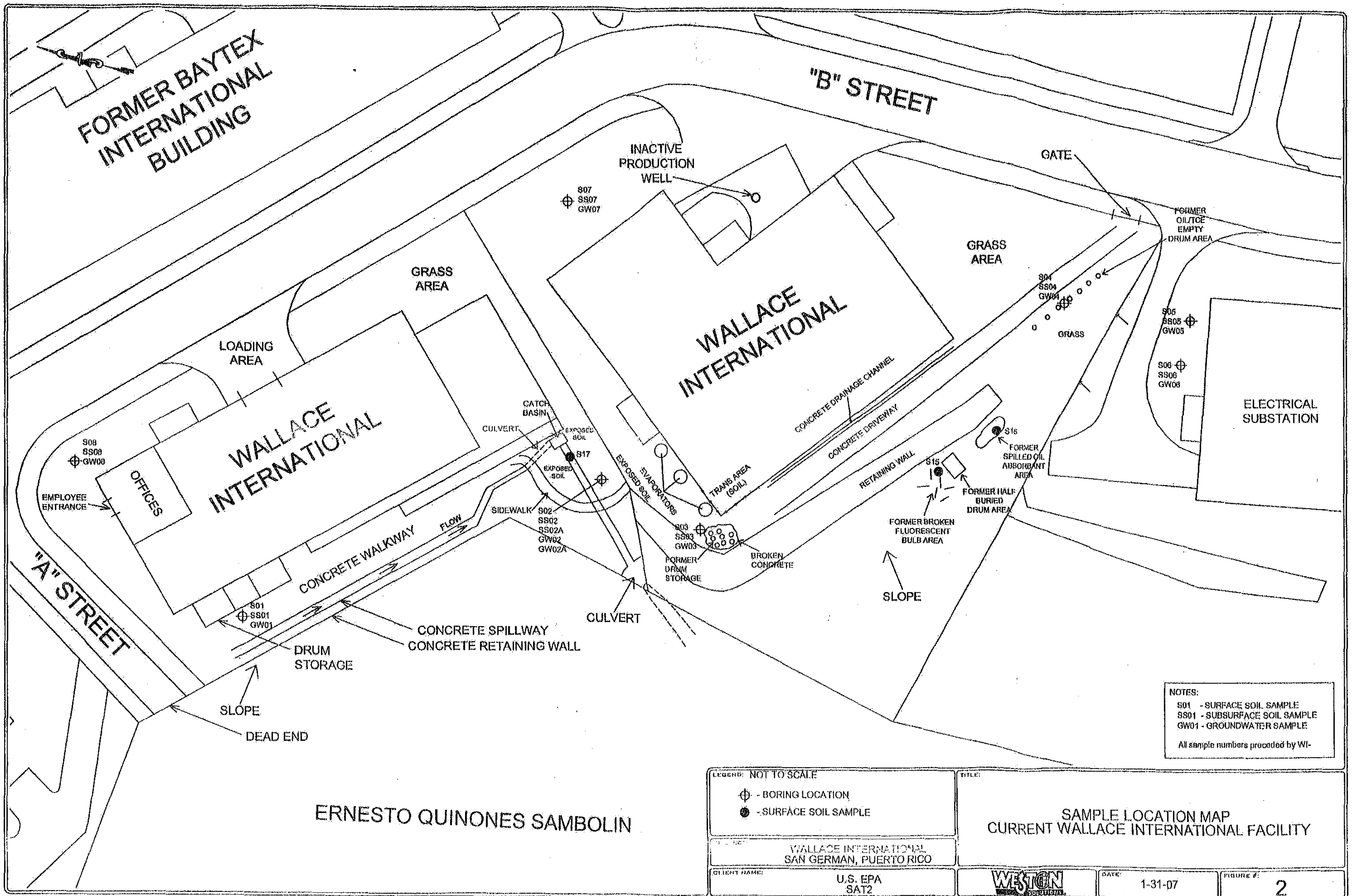
Acorn Cleaners
Volatile Organic Compound (VOC) Groundwater Results - January 26, 2007
Case No. 36112

SAT 2 Sample No.	ACPR-GW01	ACPR-GW03	ACPR-GW04	ACPR-GW05	ACPR-RIN01	ACPR-TB01
EPA Sample No.	B3RZ6	B3SO4	B3S07	B3S10	B3S11	B3S12
Matrix	Water	Water	Water	Water	Water	Water
Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Sample Depth	15 ft	7 ft	15 ft	16 ft	NA	NA
Comments				Background	Rinsate	Trip Blank
Dichlorodifluoromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichlorofluoromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	21	10 U	11 U	14 U	6.5 J	10 U
Carbon Disulfide	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl Acetate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene Chloride	5.0 U	5.0 U	5.0 U	5.0 U	0.90 J	5.0 U
trans-1,2-Dichloroethene	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
Methyl-tert-butyl ether	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U
Bromochloromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	5.0 U	5.0 U	5.0 U	5.0 U	2.0 J	2.7 J
1,1,1-Trichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cyclohexane	5.0 U	5.0 U	5.0 U	5.0 U	0.61 J	0.74 J
Carbon Tetrachloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dioxane	100 R	100 R	100 R	100 R	100 R	100 R
Trichloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylcyclohexane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	5.0 U	5.0 U	5.0 U	5.0 U	0.75 J	0.88 J
trans-1,3-Dichloropropene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-Chloropropane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ
1,2,3-Trichlorobenzene	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ

ug/L - micrograms per liter
U - Contaminant not detected
UJ - Contaminant not detected
R - Rejected
J - Estimated concentration
Note: Sample depths presented in feet below ground surface

A-5

2007 Wallace International Expanded Site Investigation



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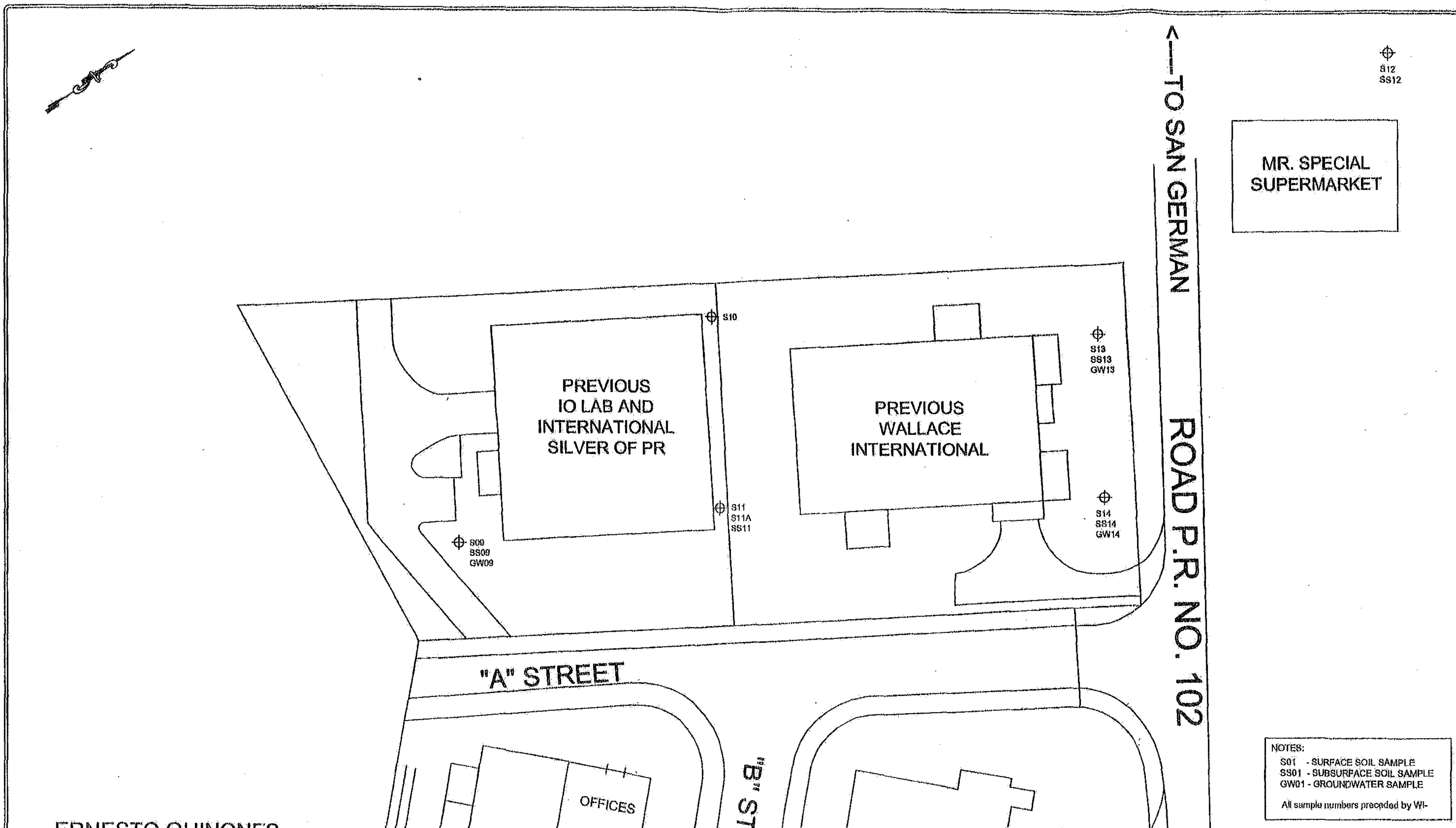

LEGEND: NOT TO SCALE ⊕ - BORING LOCATION	TITLE: SAMPLE LOCATION MAP FORMER WALLACE INTERNATIONAL/INTERNATIONAL SILVER DE PUERTO RICO PARCEL
PROJECT: WALLACE INTERNATIONAL SAN GERMAN, PUERTO RICO	
CLIENT NAME: U.S. EPA SAT2	WESTON · DATE: 1-31-07 · FIGURE #: 3

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Wallace International
VOC Soil Results - January 22-24, 2007
Case No. 36113

SAT 2 Sample No.	WI-S01	WI-SS01	WI-S02	WI-SS02	WI-SS02A	WI-S03	WI-SS03	WI-S04	WI-SS04	WI-S05	WI-SS05	WI-S06	WI-SS06	WI-S07	WI-SS07	WI-S08	WI-SS08	WI-S09
EPA Sample No.	B3RR4	B3RR5	B3RR7	B3RR8	B3RR9	B3RS2	B3RS3	B3RS6	B3RS0	B3RS8	B3RS9	B3RT1RE	B3RT2	B3RT4	B3RT5	B3RT7	B3RT8	B3RW0
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Unit	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
	0.5-1.0 ft	19.5-20 ft	0.5-1.0 ft	13-14 ft	13-14 ft	1-2 ft	28-29 ft	0.5-1.0 ft	28-28.5 ft	0.5-1.0 ft	12-13 ft	0.5-1.0 ft	19-20 ft	0.5-1.0 ft	22.5-23 ft	0.5-1.0 ft	13.5-14 ft	0.5-1.0 ft
Dichlorodifluoromethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Chloromethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Vinyl Chloride	8.0 U	7.3 U	5.9 U	400 J	900	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Bromomethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Chloroethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Trichlorofluoromethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,1-Dichloroethene	8.0 U	17 J	5.9 U	5.8 J	5.2 J	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	1.9 J	7.4 U	4.3 U	4.1 J	6.4 U	6.1 U	6.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Acetone	16 U	16 U	12 U	13 U	13 U	13 U	12 U	12 U	13 U	14 U	12 U	15 U	15 U	8.5 U	14 U	21	12 U	12 R
Carbon Disulfide	8.0 U	7.3 U	5.9 U	6.6 U	6.6 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	2.6 J	6.1 U	6.2 U
Methyl Acetate	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Methylene Chloride	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	5.6 J	6.1 U	6.2 U
trans-1,2-Dichloroethene	8.0 U	7.3 U	5.9 U	28	27	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Methyl-tert-butyl ether	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,1-Dichloroethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
cis-1,2-Dichloroethene	8.0 U	7.3 U	33	1400 J	5000	6.4 U	6.0 U	20	110	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	5.1 J	6.2 U
2-Butanone	16 U	16 U	12 U	13 U	13 U	13 U	12 U	12 U	13 U	14 U	12 U	16 U	15 U	8.6 U	14 U	13 U	12 U	12 R
Bromochloromethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Chloroform	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,1,1-Trichloroethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Cyclohexane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Carbon Tetrachloride	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Benzene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,2-Dichloroethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,4-Dioxane	160 R	150 R	120 R	130 R	130 R	130 R	120 R	120 R	130 R	140 R	120 R	150 R	150 R	85 R	140 R	130 R	120 R	120 R
Trichloroethene	8.0 U	7.3 U	970	1900	3300	1.9 J	6.0 U	860 J	210	6.9 U	3.8 J	7.4 U	7.4 U	4.3 U	3.0 J	6.4 U	6.1 U	6.2 U
Methylcyclohexane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,2-Dichloropropane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Bromodichloromethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
cis-1,3-Dichloropropene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
4-Methyl-2-Pentanone	16 U	16 U	12 U	13 U	13 U	13 U	12 UJ	12 U	13 U	14 UJ	12 UJ	15 U	16 UJ	8.5 U	14 U	13 U	12 U	12 UJ
Toluene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	2.9 J	6.1 U	6.2 U
trans-1,3-Dichloropropene	8.0 U	7.3 U	5.9 U	6.6 U	6.6 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,1,2-Trichloroethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Tetrachloroethene	8.0 U	2000	170	610	1100	6.4 U	6.0 U	110	1700	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	800	6.4 U	6.1 U	6.2 U
2-Hexanone	16 U	15 U	12 U	13 U	13 U	13 U	12 UJ	12 U	13 U	14 UJ	12 UJ	15 U	15 UJ	8.5 U	14 U	13 U	12 U	12 UJ
Dibromochloromethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,2-Dibromoethane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Chlorobenzene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Ethylbenzene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
m,p-Xylene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
o-Xylene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Styrene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
Bromoform	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 R	7.4 U	4.3 U	6.9 U	6.4 R	6.1 U	6.2 U
Isopropylbenzene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,1,2,2-Tetrachloroethane	8.0 U	7.3 U	5.9 U	6.6 U	6.6 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 U	7.4 U	4.3 U	6.9 U	6.4 U	6.1 U	6.2 U
1,3-Dichlorobenzene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 R	7.4 U	4.3 U	6.9 U	6.4 R	6.1 U	6.2 U
1,4-Dichlorobenzene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 R	7.4 U	4.3 U	6.9 U	6.4 R	6.1 U	6.2 U
1,2-Dichlorobenzene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 R	7.4 U	4.3 U	6.9 U	6.4 R	6.1 U	6.2 U
1,2-Dibromo-3-Chloropropane	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 UJ	5.8 U	6.3 U	6.9 UJ	5.9 UJ	7.4 R	7.4 UJ	4.3 U	6.9 U	6.4 R	6.1 U	6.2 UJ
1,2,4-Trichlorobenzene	8.0 U	7.3 U	5.9 U	6.6 U	6.5 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 R	7.4 U	4.3 U	6.9 U	6.4 R	6.1 U	6.2 U
1,2,3-Trichlorobenzene	8.0 U	7.3 U	5.9 U	6.6 U	6.6 U	6.4 U	6.0 U	5.8 U	6.3 U	6.9 U	5.9 U	7.4 R	7.4 U	4.3 U	6.9 U	6.4 R	6.1 U	6.2 U

Results reported in micrograms per kilogram (µg/kg)
Shading indicates a positive detection
UJ - Contaminant not detected
U - Contaminant not detected
J - Estimated Concentration
R - Rejected
Sample SS02 is a duplicate of sample SS02A; Sample S11A is a duplicate of sample S11

Wallace International
VOC Soil Results - January 22-24, 2007
Case No. 36113

SAT 2 Sample No.	WI-SS09	WI-S10	WI-S11	WI-S11A	WI-SS11	WI-S12	WI-SS12	WI-S13	WI-SS13	WI-S14	WI-SS14	WI-S15	WI-S16	WI-S17
EPA Sample No.	B3RW1	B3RW3	B3RW6	B3RW7	B3RW8	B3RX0	B3RX1	B3RX3	B3RX4	B3RX6	B3RX7	B3RX9	B3RY0	B3RY1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Unit	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
	14.5-15 ft	0.5-1.0 ft	1.5-2.0 ft	1.5-2.0 ft	29-30 ft	2.0-2.5 ft	33-34 ft	1.5-2.0 ft	24-25 ft	1.5-2.5 ft	18.5-19	0.0-0.5 ft	0.0-0.5 ft	0.0-0.5 ft
Dichlorodifluoromethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Chloromethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Vinyl Chloride	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Bromomethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Chloroethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Trichlorofluoromethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,1-Dichloroethene	7.0 U	6.4 U	7.0 U	6.9 U	2.6 J	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Acetone	14 U	13 U	14 R	14 R	12 U	12 U	10 U	11 U	14 U	14 U	14 U	9.6 U	8.7 U	13 U
Carbon Disulfide	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Methyl Acetate	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	3.9 J	8.1	16
Methylene Chloride	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
trans-1,2-Dichloroethene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Methyl-tert-butyl ether	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,1-Dichloroethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
cis-1,2-Dichloroethene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
2-Butanone	14 U	13 U	14 R	14 R	12 U	12 U	10 U	11 U	14 U	14 U	14 U	9.5 U	8.7 U	65
Bromochloromethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Chloroform	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,1,1-Trichloroethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Cyclohexane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Carbon Tetrachloride	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Benzene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,2-Dichloroethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,4-Dioxane	140 R	130 R	140 R	140 R	120 R	120 R	100 R	110 R	140 R	140 R	140 R	95 R	87 R	130 R
Trichloroethene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	2.6 J
Methylcyclohexane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,2-Dichloropropane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Bromodichloromethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
cis-1,3-Dichloropropene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 UJ	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
4-Methyl-2-Pentanone	14 UJ	13 UJ	14 R	14 R	12 UJ	12 UJ	10 UJ	11 U	14 UJ	14 UJ	14 UJ	9.5 U	8.7 U	13 U
Toluene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	2.5 J	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
trans-1,3-Dichloropropene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 UJ	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,1,2-Trichloroethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 UJ	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Tetrachloroethene	7.0 U	6.4 U	7.0 U	6.9 U	140	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
2-Hexanone	14 UJ	13 UJ	14 R	14 R	12 UJ	12 UJ	10 UJ	11 U	14 UJ	14 UJ	14 UJ	9.5 U	8.7 U	13 U
Dibromochloromethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,2-Dibromoethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Chlorobenzene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Ethylbenzene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	2.9 J	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
m,p-Xylene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	13	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
o-Xylene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	3.2 J	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Styrene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
Bromoform	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 R
Isopropylbenzene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,1,2,2-Tetrachloroethane	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 U
1,3-Dichlorobenzene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 R
1,4-Dichlorobenzene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 R
1,2-Dichlorobenzene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 R
1,2-Dibromo-3-Chloropropane	7.0 UJ	6.4 UJ	7.0 UJ	6.9 UJ	6.1 UJ	6.1 UJ	5.1 UJ	5.5 U	6.9 UJ	6.9 UJ	6.8 UJ	4.8 U	4.4 U	6.4 R
1,2,4-Trichlorobenzene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 R
1,2,3-Trichlorobenzene	7.0 U	6.4 U	7.0 U	6.9 U	6.1 U	6.1 U	5.1 U	5.5 U	6.9 U	6.9 U	6.8 U	4.8 U	4.4 U	6.4 R

Results reported in micrograms per kil
Shading indicates a positive detection
UJ - Contaminant not detected
U - Contaminant not detected
J - Estimated Concentration
R - Rejected
Sample SS02 is a duplicate of sample

8